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REPORTS OF COMMITTEES

OF THE

SENATE OF THE UNITED STATES

FOR THE

SECOND SESSION OF THE FIFTY-THIRD CONGRESS.

1893-'94.

IN SEVENTEEN VOLUMES.

Volume 1.—Nos. 73 to 330, inclusive, except Nos. 93, 116, 200, 201, 227, 235, 240, 259, and 293.
Volume 2.—No. 227, Hawaiian Islands.
Volume 3.—No. 235, Coinage Laws of the United States.
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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 331.

IN THE SENATE OF THE UNITED STATES.

APRIL 14, 1894.—Ordered to be printed.

MR. MORGAN, from the Committee on Foreign Relations, submitted the following

REPORT:

[To accompany bill S. 1481.]

The action of the Committee of the Senate on Foreign Relations upon bills heretofore reported for aiding in the construction of an interoceanic canal through Nicaragua is set forth in reports No. 1944, Fifty-first Congress, second session, and No. 1142, second session of the Fifty-second Congress, made by Mr. Sherman as chairman of the committee.

Those reports are adopted in this report and are made a part thereof.

Since December 22, 1892, the date of the last report of the committee, the president of the canal company has made an annual report to the Secretary of the Interior, as required by law, which, with his report made December 3, 1892, is appended to this report. These reports are made under oath by the president, and they set forth the actual condition of the work on the canal and of the canal property up to December, 1893. Before the date of the last of said reports work on the canal was suspended in consequence of the disturbed state of the money market, and has not been resumed.

In consequence of such suspension there has been some loss, but not of a serious character, in the depreciation of the plant connected with the construction of the canal, but all the dredges and machinery requisite for dredging, and the houses, structures, and wharves necessary for the work on the eastern division, have been supplied, and, with slight repairs, are in condition for the immediate resumption of the work on the canal.

These facilities for the work have been carefully prepared, and at a very low cost. The work on the canal and railroad alongside and the deepening of the channel leading into the harbor at Greytown has been done at a cost that is within the estimates of the engineers.

Some expected difficulties have been solved in respect of clearing the canal line, and as to the nature of the soil in the low grounds between the seashore and the divide formed by a ridge of low hills to the west of the mouth of the canal. These apprehended difficulties have been developed and overcome and leave the entire line of the canal, from ocean to ocean, free from all practical embarrassment arising from any uncertainty as to the nature of the soil through which it is to be constructed.

ENGINEERING AND COST.

The engineering work on the canal, upon which depends its success as a waterway, has been done so thoroughly as to escape even a sug-

gestion that it is faulty, or that it needs correction, after a critical examination by many of the best engineers in the United States and in Europe.

The details of the engineering and the estimates of cost of the canal are given in the previous reports of the committee and need not be here repeated as no occasion has arisen for any alteration in them.

The grand total of the estimates of the actual cost of the canal, completed for full service and extending to deep water in the Caribbean Sea and Pacific Ocean, through completed harbors, is stated in the report of Chief Engineer A. G. Menocal "revised to conform to information obtained up to January 1, 1890," at $52,067,340.55. To this sum Mr. Menocal added "surveys, hospitals, shops, management, and contingencies, 25 per cent," amounting to $13,016,835.45, making the grand total of $65,084,176.

At the request of the chief engineer, the Maritime Canal Company submitted the full data of his estimates to a board of five engineers, who were selected without any suggestion from Mr. Menocal, for critical examination and revision.

This board was composed of the following named engineers: John Bogart, E. T. D. Myers, A. M. Wellington, H. A. Hitchcock, and Charles T. Harvey, all of them men of distinguished ability and established reputation.

They united in a report dated May 9, 1892, in which they increased the estimates of Mr. Menocal to the sum of $73,166,308 for actual cost of the canal and $14,633,262 "to cover specified and unspecified contingencies, labor agencies, shops, police, sanitary service, and incidentals." The grand total of their estimate was $87,799,570.

The reasons for the increase of the estimates are stated fully in their report.

They were cautionary in their character and largely conjectural, as is shown by the following extract from their report:

> We have carefully examined the unusually full maps, profiles, borings, samples of materials, etc., which have been prepared and collected under the directions of your chief engineer, and the completeness and excellent form of which reflect credit upon your engineering staff.
>
> We find certain elements of the designs submitted which may probably be advantageously modified. This would in some cases reduce and in others increase the quantities. It is also altogether likely that some parts of the work may be let at lower and other parts at higher prices than are estimated. We, however, are disposed to base our conclusions on quantities and prices which should prove sufficient to accomplish it upon the assumption of good and honest management, backed by an ample treasury. We have necessarily borne in mind the fact that the cost of the notable precursors of this canal project, both at Suez and Panama, has greatly exceeded the amount of the original estimates, and that this has been true of many other important works. While this might be, perhaps, in a large measure traced to unfortunate management, as well as the lack of such careful preliminary studies as have been laid before us in this case, we have nevertheless endeavored to guard against a similar result by a liberal allowance for every apparent contingency.
>
> Acting on this principle, we have not yet deemed it wise to reduce the quantities or prices of your chief engineer's estimates in any instance, even when it appeared possible that this might prudently be done. His figures are, of course, founded upon a better knowedge of the local conditions than we can now possess. But to the extent to which it has appeared at all doubtful we have liberally increased one or both.

The Maritime Canal Company and the Canal Construction Company, composed of men of great business capacity and experience, proceeded to raise the money to inaugurate this work and to prosecute it until it would command the confidence of capitalists and the stock exchange, upon the basis of this increased estimate, and they have expended, wisely and with careful economy, more than $4,000,000 upon it. The work, so far, has fallen within the estimates of Mr. Menocal,

The Government of Nicaragua caused a careful examination of the work to be made, in order to ascertain and determine whether it had been prosecuted in compliance with the conditions of the concession. The President of Nicaragua, in a message to the Congress of that Republic, made the following statement as to the operations of the Maritime Canal Company up to December 25, 1890:

The questions with the Interoceanic Canal Company, which were pending at the death of President Carazo, have been satisfactorily settled by an agreement made the 8th of October last year, and from that date the works of construction have been prosecuted, if not with the rapidity which we are bound to desire, with patriotic impatience, yet with the firmness, formality, and good judgment required to raise the credit of the enterprise in the money markets and attract the capital wanted for its realization.

The company has fully complied with the condition imposed upon it by article 47 of the Cardenas-Menocal contract—that is, to spend $2,000,000 within the first year after beginning the work of construction; and all the preliminary works already finished and the works which are being carried on give us right to believe that the opening of your Isthmus will become within a relatively short time a beautiful reality. Only yesterday and a vessel of great draft entered the harbor excavated by the canal company, in the same place where for so many years nothing could be seen but lagoons and banks of shifting sand.

The report of the commissioners appointed to inspect the work on the canal was made to that Government on November 6, 1890, and stated that after investigation they found that the Maritime Canal Company had expended between October 5, 1889, and October 7, 1890, the sum of $3,099,971.02 upon the canal.

This report was received and published in the Official Gazette of November 22, 1890, and thereupon it was officially stated by President Sacaza that all the requirements of article 47 of the concession had been fully complied with by the Maritime Canal Company of Nicaragua.

THE ACTION OF CONGRESS.

While this work was being thus successfully prosecuted by private citizens, with their own money, and after a contract had been made with a construction company for the entire work to be done on the canal, the Senate, on April 11, 1890, adopted the following resolution, in an executive session:

Resolved, That the Committee on Foreign Relations be, and it hereby is, directed to inquire into what steps have been taken under the act of Congress entitled "An act to incorporate the Maritime Canal Company of Nicaragua," approved 20th February, 1889, and what are the present conditions and prospects of the enterprise; and to consider and report what, in its opinion, the interests of the United States may require in respect of that interoceanic communication.

In obedience to that resolution, the committee proceeded to make inquiry and summoned before it all the persons who had accurate knowledge of the subject committed to them. The statements of the persons examined and the papers laid before the committee are printed in the report of the committee made, unanimously, on the 10th January, 1891.

A free and full discussion was had between the committee and the officers of the Maritime Canal Company and the construction company, which resulted in the bill first reported by the committee to the Senate. That bill embodied the terms upon which it was ascertained that all persons concerned in said canal as owners or contractors were willing and consenting to place the concessions of Nicaragua and Costa Rica, and all that had been done under them within reach of the power of Congress in granting aid to the canal, so that the Government of the United

States would be fully secured against loss upon its guarantee of the bonds of the company to the amount of $100,000,000.

The reduction of the stock of the company to $100,000,000, the limitation of the issue of bonds to a like sum, the retirement and cancellation of all the existing contracts and obligations of the company, and the appointment of Government directors in the company, were the leading conditions imposed upon the Maritime Canal Company in the bill that was reported to the Senate. It is not necessary here to point out more fully the provisions of that bill.

This action of the Senate and its acceptance by the people created the belief and excited the desire of the country that the canal would be speedily constructed under the immediate auspices of the Government of the United States, and with the use of its credit.

This sentiment and conviction has increased from that time to the present, and it has been encouraged by the fact that the great leading political parties of the country have declared in favor of its construction by the United States, as far as that may be done under the concessions of Nicaragua and Costa Rica. In the annual messages of our Presidents this subject has uniformly received a strong indorsement. The policy of the measure then reported, and of the bill herewith reported, is largely based upon the duty of Congress to make the rates of tolls on the canal as cheap as is consistent with duty to the stockholders for the benefit of our coastwise commerce.

Under such circumstances it was natural that the owners of these concessions should confidently expect that they would be virtually required to yield their property and their rights as concessionaires to the disposal of Congress.

The action of the Senate was taken up, eagerly, by the people in all parts of the country, who, in State and commercial conventions, in boards of trade, and in earnest individual effort, discussed the subject and sent many memorials to Congress asking that the United States Government would proceed with the work, so that this should be "an American canal under American control." When the people had thus taken up the subject and were pressing its consideration it seemed to be impossible, as it would be unpatriotic, that the canal should be placed under the control of a European Government, or should be constructed by and placed in the power of European capitalists.

Under such conditions the property of the company and its credit were virtually placed in the power of Congress, and the company was so far deprived of its freedom of action that no effort was made to secure foreign aid, either from capitalists or governments.

Then the disturbance in the financial affairs of the world, which began in the Argentine Republic, extended to Australia and then to Europe, and finally to the United States, cut off all hope, apparently, of the construction of the canal for years to come by the unaided efforts of the company, and forced the suspension of work upon it.

When the canal company was thus rendered powerless, as it appeared, to go on with the work, capitalists from Europe made propositions to the company, which are yet pending, to enter into an agreement for the completion of the canal on terms far more liberal to its present owners than any that have been offered by the United States.

If action by Congress is delayed unreasonably the company will be compelled either to abandon the concessions and lose the money they have already invested in the canal or to accept the offers made to them by the foreign capitalists.

If either of these results should follow the inaction of Congress, the people could not censure the canal company for yielding to a fate that they could have avoided if Congress had not taken up the subject of constructing the canal through the aid of the United States.

The work done on the canal is permanent, as far as it has progressed, is important as a demonstration of the final success of the location and plan of the canal, and it will not be abandoned by the commercial world. The canal will be built.

THE CONCESSIONS.

The value of the concessions made by Nicaragua and Costa Rica to the "company of construction," which have been made permanent and irrevocable by the decrees of those Governments, could scarcely be overstated; and the Government of the United States, in its legislation, granting a charter to the company which is accepted by those governments, and is being acted upon and conformed to by them, is closely connected with all that is granted in those concessions.

The concessions are very liberal in grants to the canal company of every right and privilege that can be necessary for the construction, control, protection, neutrality, maintenance, and management of the canal. They are framed with extreme care in every particular, so as to define clearly the rights and privileges embraced in the grants and reservations. The concessions cover the period of two centuries. They cover a fee-simple grant of more than a million acres of land of very valuable quality, in a country that is elevated considerably above the water level, with an equable and healthy climate, with cheap and convenient transportation, after the canal is completed, covered with valuable forests; especially adapted to the culture of coffee, cocoa, sugar, sisal, and other valuable textiles, and all the tropical fruits.

Mr. Menocal, the chief engineer of the maritime canal of Nicaragua, in a recent letter addressed to the chairman of this committee, thus describes the lands granted to that company in the concessions of Nicaragua and Costa Rica:

U. S. NAVY-YARD, *Norfolk, April 9, 1894.*

Hon. JOHN T. MORGAN,
U. S. Senator:

DEAR SIR: Referring to your inquiries in connection with the lands granted by Nicaragua and Costa Rica in their respective concessions to the Maritime Canal Company of Nicaragua, I beg to say that, as a large proportion of this land is comprised in alternate irregularly shaped lots on both banks of the river San Juan, from the lake to Ochoa, and on the flowage line of the basins in the valleys of the San Francisco and Deseado, their aggregate acreage can only be accurately determined after a careful location of all the lots fronting on the sinuous banks of the river and basins. However, it may be safely estimated that the fee simple grants by Nicaragua aggregate not less than 800,000 acres and those by Costa Rica 200,000 acres.

Both Nicaragua and Costa Rica have placed at the disposal of the company, free of charge and without reservation, all the spaces belonging to the States, whether on the mainland or in the lake and its islands, or at the ports, roadsteads, or rivers, necessary for the construction of the canal and its accessory works, and for the deviations of streams as well as for reservoir, the areas flooded by waters raised by the construction of dams, and the spaces occupied by the ports, railroads, light-houses, buildings, etc. The acreage of the lands included in these easements may be estimated at not less than 150,000 acres, and 50,000 in Nicaragua and Costa Rica, respectively.

All the lands occupied by the canal from the Atlantic to the lake belong to the states of Nicaragua and Costa Rica. West of the lake the canal is located through private lands, and the canal company has already paid to the Government of Nicaragua $50,000 for 2,000 acres of land required for the construction of the canal on that side, as provided in Article XX of the concession.

Of the 1,000,000 acres of lands included in the fee-simple grants of Nicaragua and Costa Rica 360,000 acres are located in alternate lots on both sides of the canal and along the banks of the river San Juan from the Atlantic to the lake, and 640,000 acres are comprised in 40 lots of 20 square miles each granted by Nicaragua, and 25 lots of 8 square miles each ceded by Costa Rica. These lots are to be selected by the company in accordance with these governments from the existing public lands.

As to the value of these lands, it is difficult to arrive at a fair estimate at present. Between the lake and the Atlantic the country is covered with a virgin forest, containing an unlimited supply of timber, well adapted for constructions of all kinds, and of great value in connection with the building of the canal and for exportation when adequate means of transportation to the ports have been established. At present the unimproved navigation on the river San Juan is the only route connecting the Atlantic with the interior of the country. There are several large streams, tributaries of the San Juan, which, by the building of the canal, would be made navigable several miles into sections of the country now inaccessible by land or water, but these streams, like the mother river, are now in the same condition the Spanish conquerors found them.

The soil is uniformly fertile and offers many advantages for the cultivation of sugar, rice, beans, corn, fiber plants, cocoanuts, bananas, oranges, pineapples, and other tropical and semitropical plants, and in the highlands specially adapted for the cultivation of coffee. This statement is sustained by the dense growth and high forests covering that section of the country and by the small settlements found on the banks of rivers, where the native huts are surrounded by exuberant orchards and vegetable gardens, from which the settler gathers two or more crops annually by only dropping the seeds and letting nature take its course.

On the coast the land is low, but well drained by numerous small streams and small lakes, and is specially adapted for the cultivation of bananas and other tropical fruits. A few miles to the interior the foothills are met with, and from there to the lake the country is rolling, with intervening fertile valleys, the hills rising 50 to 300 feet; the whole being well watered and covered with a luxurious growth and giant trees.

Under the modifying influence of the northeast trades constantly cooling and purifying the air, the temperature varies from about 74° at night to 85° in the shade at noon, rarely reaching 90°; and as to the healthfulness of the country I can add to the official records of the Government surveying expeditions and of the anal company my own personal experience in the last twenty years. During that time I have made eleven trips to Nicaragua, with an average residence in the country of about six months on each trip, or five and one-half years altogether. While there, myself and assistants were constantly engaged in the arduous work of exploring this uninhabited section, cutting our way through the dense undergrowth, wading rivers and swamps, and running instrumental lines in all directions where the topography suggested any favorable features for the location of the canal.

We lived on the plainest food and slept at night under the scanty protection of a piece of canvas, a rubber blanket, or a few palm leaves. These hardships and privations were of several months duration, and on some of my trips without medical advice. Fortunately none was ever needed. No member of the party ever suffered serious inconvenience from illness due to the climate, and our health, far from being impaired, was generally improved, and we all returned to our homes in better condition than when we left it. The country, therefore, offers advantages for agricultural pursuits as well as for residence, and it is reasonable to expect that, with the building of the canal and the introduction of railroads, improved water transportation, and the increase of population, the land grants referred to will become very valuable.

Hoping that this information may be of some value to you in connection with the subject we both have so much at heart, I remain, with best wishes and kindest regards, yours sincerely.

A. G. MENOCAL.

All minerals in these lands are granted to the company, and they are regarded by careful observers as being valuable.

When the canal is completed these lands will be worth not less than $10,000,000, and if they are sold during the progress of the construction will yield a large sum to the treasury of the company.

Among the valuable grants made to the canal company are the bed of the river San Juan from the location of the great dam into and through Lake Nicaragua, for all the uses and purposes of constructing the canal and of unrestricted navigation.

COMMERCIAL AND POLITICAL VIEW.

A more general view of the value of the grants in these concessions to the commerce of the United States, to our coast-line traffic, and with reference to their importance in a military sense, necessarily raises the estimate of their value into a sum which, if counted in money, is really incalculable. The former reports of this committee, which are embodied in this report, contain exact data throwing the full light of truth upon this subject, and render a more extended comment unnecessary.

Several valuable papers that treat of these subjects have been recently printed by order of Congress, included in which are the reports of Capt. Scriven and Maj. Dutton of the U. S. Army, and others, besides reports upon Hawaii and our rights in Bering Sea, which bear with great force upon the commercial and military importance of the canal to the United States. Concessions of such value and importance that have already commanded an expenditure of more than $5,000,000, wisely and economically employed in permanent work on the canal, under the careful direction of private enterprise, must be worth more to the owners than the money they have expended, and will command a greater sum in the market if they are offered for sale to all bidders.

To the United States, in a political and strategic view, and as a sea route to our Pacific coasts, shortened by more than half the length of the present ocean route, this waterway is of greater importance than the Suez Canal is to Europe and Great Britain, or than the freedom of the Bosphorus would be to Russia.

As a competitor with Great Britain and other transatlantic nations for the commerce of the Pacific Ocean, this canal is indispensable to the United States.

On these points, also, the previous reports of this committee were quite full, and they supply the data for almost exact estimates that any one can easily make, and need not now be repeated.

A general view of the geography of the coasts of the Atlantic and Pacific oceans and the lands that lie between them leave no room for doubt that the amount of tonnage that must pass through this canal will, almost in the beginning, equal that which now passes through the Suez Canal, and will be, in the near future, very much greater.

The exchange of commodities between the eastern coasts of America and the eastern coasts of Asia, and of Japan and the islands of the Pacific Ocean, which will seek the transit through Nicaragua as the shortest and most open route of navigation, will, of itself, supply more tonnage to pass through this canal than all that now passes through the Suez Canal.

The trade between these countries will be more direct than it is now, with London as the common point of distribution, and will therefore be cheaper than the present system. The Nicaraguan Canal will thus be given the preference over the Suez Canal by merchants and navigators. When we add to this the traffic that will pass in ships between the Eastern and Western coasts of the American hemisphere, the amount of tonnage that will pass through the Nicaraguan Canal must be largely in excess of that which will find its way through the Suez Canal. A carefully prepared statement is appended to this report, marked Exhibit No. 3, which shows the value of the commerce that is tributary to this canal.

The Cordillera range of mountains, extending the entire length of South America, forbid the hope that the eastern and western coasts of that continent can ever interchange their commerce by means of railways so as to make it advantageous.

Although the United States and Canada have, in a measure, overcome the like, but less difficult, obstructions of their mountain ranges, by driving railroads across them, the expenses of transportation are so heavy that they practically forbid commerce between the Eastern and Western coasts of North America.

On this account, the commerce between the eastern and western coasts of Mexico by rail is not considerable, and as to Canada, it is trifling; while as to the United States it is greatly below its proper value, and our Pacific-coast commerce is seeking ship communication with Europe around Cape Horn and through the Suez Canal at a destructive loss of time and interest, and an increase of freights and of damage by long journeys on the ocean through all seasons and climes.

"The ship's journey around the Horn" is a distress to commerce that the civilization of the age requires to be removed, and the route through Nicaragua is the only possible remedy for this universal evil.

It is not too much to say that this condition, so easy to be remedied, will be a reproach to the men of this age if some active and decided movement is not made to relieve against it.

To point out the dangers, hardships, loss of time, and the destruction of life and property incident to this only waterway connecting the Atlantic and Pacific oceans, which must be navigated in the roughest seas and the most inhospitable climate in all the world, is only to repeat the experience of seafaring men for ages past, and to evoke a prayer from them that the United States will do its obvious duty towards them.

THE STRATEGIC VIEW OF THE CANAL.

The importance of the Nicaragua Canal to the United States in a military and strategic view would demand of us an expenditure of ten times the sum that it will cost to build and protect it. Germany and Great Britain have already occupied every island and harbor in the Pacific Ocean south of the Alaskan peninsula that is a fit place for a naval station or for dock yards, except in Hawaiia and the harbor of Pango Pango, in Samoa.

On these we seem to have a feeble hold. On the southern and eastern seas that wash our coasts, these powers and Spain have occupied and have strongly fortified every available harbor from Honduras to Halifax. The greater number of these naval strongholds are established for no purpose of protecting or defending any European power.

Those in the Atlantic waters and Carribean Sea are intended to control the United States in her military operations, while those in the Pacific Ocean are intended to hold military control over the Western shores of both the American continents. The United States is completely circumvallated, on the north by British Possessions and the frozen ocean, and on the east, south and west by these military posts.

The embarrassment of this situation, not to say its danger, ought to excite our earnest attention, at least to the finding of some way to avoid it, if we can not get our consent to overcome it. In our efforts so far to provide some safeguards against a strong and inflexible aggression that moves with a settled purpose to gain every point where advantage is to be found, and to hold it, we have expended, possibly, more money, but with less effect, than European powers have expended to encompass us with fortified naval stations near our coasts as bases of supplies for their fleets.

From these the most powerful ships of war can assail our harbors, and retire to cover in case of necessity, while the United States must double Cape Horn in sending assistance from our eastern to our western coasts.

With the canal at our command we need not have two fleets to protect our coasts, as we are now compelled to do, at a cost already excessive and is greatly to be increased. Without the canal we are, relatively, in a situation of deplorable weakness.

COMPARED WITH THE SUEZ CANAL.

When private enterprise in Southern Europe first addressed itself to the task of opening a sea-level canal through the Isthmus of Suez, there was no lesson of experience to guide the movement or to assure its success. After a time the Khedive of Egypt, without the firman of his suzerain, the Sultan of Turkey, supported the undertaking and put heavy burdens on his people to sustain it.

This wise and heroic decree of the ruler of a government nearly relapsed into barbarism secured the Suez Canal and should have secured the inviolable independence of his country. But the value of the canal to commercial and political aspirations for dominion attracted the cupidity of Great Britain and has drawn that great and costly work and the independence of Egypt into the grasp of that Empire.

If it shall result, from our indifference or dread of expansion in the direction of national duty and of self-preservation, that Great Britain or any other great European power shall get the control of the concessions that we have, so far, refused, the result is even now plainly manifest, that the Central American States will repeat the experience of Egypt.

Then we shall have our country broken in its coast line of trade and defenses, by a European power, not in violation of the Monroe doctrine, but this will be done in the name of these Republics on and near the line of the canal. The precedent for this line of action is already established in the moral forces that keep Great Britain in control of the Mosquito Reservation in Nicaragua, and in the actual sovereign assertion of right and power over The Belize and the Bay Islands, against which we have "protested overmuch."

This is said to be impossible without our defeat in war. But why should we answer with a threat of war an aggression that can be avoided, or repelled, by the guarantee of the bonds of a company seven-tenths of whose stock is owned by the United States?

An examination of the financial value of the canal will show that it is to be the best great property in the world. The Suez Canal is an unquestionable proof of this statement, and we add to the former statements of the committee, on this point, the following facts:

SUEZ CANAL.

The Suez canal is 87 miles long, 66 of which are actual canal, the other 21 miles being lake navigation. The canal and its appurtenances were completed on or about the 1st of January, 1870, and cost about $91,000,000. Since that time there have been expended for betterments and improvements, including the deepening of the channel, about $24,000,000 more; bringing the total cost of the canal up to about $115,000,000. The canal was originally 26 feet deep. Its present depth is 28 feet. The canal to-day is capitalized at about $90,500,000 in stock and obligations. The difference between the cost and its present capitalization in stock and bonds was made up by receipts from various sources applied to construction and improvement account.

It is commonly reported that the actual cost of construction did not exceed $50,000,000.

The following statement shows the number of ships and net tonnage which passed through the Suez Canal, and the gross receipts therefrom, from 1870 to 1892, inclusive:

Year.	Number of ships.	Net tonnage.	Gross receipts.
			Francs.
1870	488	436,600	4,345,758
1875	1,494	2,009,984	26,430,750
1880	2,028	3,057,421	36,492,620
1885	3,624	6,335,752	60,057,259
1890	3,389	6,853,637	68,983,500
1891	4,206	8,699,020	83,421,504
1892	3,559	7,712,028	74,888,561

The cost of administration, operation, and maintenance of the canal for the years 1888 to 1892, inclusive, was as follows:

1888 (about)	$1,200,000
1889 (about)	1,350,000
1890 (about)	1,375,000
1891 (about)	1,475,000
1892 (about)	1,435,000

A large proportion of these expenses were incurred by the dredging made necessary to relieve the canal from the drifting sands of the desert which accumulate.

The actual net revenues of the company for a series of years past have been upwards of $12,000,000 annually. The net profits in 1892 were 41,728,543 francs, or about $8,345,000, and the dividends declared for said year were 19·8 per cent, including the taxes retained for the sinking fund.

The shares of the company, originally issued at 500 francs each, are quoted on the Paris Bourse at 2,692.50 francs.

The shares of the Suez Canal held by the English Government and purchased for £4,000,000 are worth to-day over £19,000,000 in the open market.

The business of 1892 and 1893 suffered from the general commercial depression throughout the world, and was lighter than that done in 1891. In the said last-mentioned year the net profits were 49,091,892 francs, or about $9,800,000, and the dividends declared on the stock that year amounted to 22·4 per cent.

The effect of the Suez Canal upon the commerce of the world is apparent from the fact that whereas in 1870, the first full year of its operation, there passed through the canal 486 vessels, registering 436,600 tons, the number of vessels passing in 1891 was 4,207, registering 8,700,000 tons.

The most significant fact in this enormous increase is that the average size of the vessels using the canal in 1870 was but little over 1,300 tons register, while in 1891 it had increased to over 2,090 tons, and in 1892 to 2,200 tons.

The outside limit of the cost of the Nicaraguan Canal is $100,000,000, but the committee assume, in correspondence with the estimates that have been so carefully made and revised, that the cost will not exceed $70,000,000, and that, if it should, there will be a fund in the treasury of the company from the sales of stock remaining undisposed of equal to $16,000,000, in all $86,000,000. This stock will go to par as soon as the construction of the canal is resumed, if not as soon as Congress has provided for the guaranty of the bonds of the company.

THE ADVANTAGES AND RISK.

The advantages to be derived from the ownership by the United States of $70,000,000 of the stock of this company will be a boon to the people that is not equaled by the benefits of any work of a public character in which the United States has ever engaged. It is a free gift to the country, which the enterprise, courage, and skill of a few earnest men has placed in reach of the Government that it could never have acquired through diplomatic effort. Under the treaty made with Nicaragua by Secretary Frelinghuysen, the profits to be derived by the United States from the canal tolls were not nearly so great as they would be under the bill now reported, while that concession was to be at a cost of $5,000,000; and in the arrangement proposed by this bill, the United States gets $70,000,000 in stock that is worth more than the stock in the Suez Canal, without cost and without danger of liability.

It is entirely improbable that the Treasury of the United States will ever be required to advance any money either for the construction of the canal or for the payment of interest on the bonds, even while the canal is in process of construction. The interest on the bonds, even after $70,000,000 has been expended, is $2,100,000 per annum. If it requires seven years to complete the canal, the issue of bonds required will be about $10,000,000 each year: that is, $300,000 the first year, $600,000 the second year, $900,000 the third year, and so on, until the seventh year, when the sum needed to meet the interest would be $2,100,000. At that time the canal will be opened and in full operation, and its income even for the first year will reach $5,000,000, at the rate of tolls now received by the Suez Canal.

At the beginning of each quarter the bonds required to be guaranteed and sold will cover the interest to accrue during that period, and there can be no doubt that the accruing interest will thus be provided for in every case. Under the plan of this bill it is scarcely possible that the Treasury of the United States will ever be called upon to supply a dollar of money to the canal beyond the small sums that are required to meet the expenses of the Government inspections required by the act, and these will be made by naval and military officers, in almost every instance, who are already in the pay of the United States.

When Great Britain, after the Suez Canal was completed, saw her advantage in the investment of £4,000,000 in its stock, there was only a vague impression that it would result in a profit, in money, yet in about fifteen years that has increased nearly 400 per cent, and is paying an annual dividend of over 22 per cent.

It is impossible to avoid, or to discredit, the weight of this fact of actual experience, in a matter that is so nearly a case in point. The only difference in the two canals, as earners of profit, is that the Nicaraguan Canal has a vastly wider and more lucrative field of commerce from which to draw its revenues than can be relied upon by the Suez Canal.

Can it be expected that Great Britain will cease its efforts to gain control of the Nicaraguan Canal, and to hold the keys to the equatorial belt of commercial dominion that reaches around the world, when her experience in controlling the Suez Canal has brought to her, in less than a quarter of a century, such increase of profit in money, and such extension of commercial and political power?

One of these new gateways of the commerce of the world must belong to Americans and be under American control. Private enterprise and

capital can build them, but they must be under national care, and be kept open by a powerful arm for equal international use.

The Government of the United States and our responsible men of this day will have a severe reckoning with posterity and with their political opponents, if the example of Great Britain goes unheeded and her manifest policy to dominate the commerce of the world is quietly permitted to prevail, to the dishonor of our country and the disappointment of the hopes and desires of the people of the Western Hemisphere.

DIPLOMATIC AND OTHER OBJECTIONS.

In the former reports of the committee the right of Congress to engage in this work has been sufficiently discussed.

There seems to be no objection urged at this time, except that it is not a wise policy of our Government to do anything for our Navy, or for our national defense or protection, or for our commerce except within our own borders. What will we do to protect the fur seals under the restrictions of such a policy?

Objection has been made that the Maritime Canal Company of Nicaragua is a private corporation, whose bonds the United States is asked to guarantee. In law and in fact this is a wholly untenable statement. Private individuals can not own more than 7 per cent of the stock of this company under the provisions of this bill. The United States, under the bill now reported, will own 70 per cent of the stock, Nicaragua will own 6½ per cent, and Costa Rica will own 1 per cent of the stock.

So far from this being a private corporation, or one for the benefit of private persons, three independent governments will own 77½ per cent, the Maritime Company 16½ per cent, and private persons may own 7 per cent of the stock.

These facts completely answer these objections; but, if more was needed, the concessions and charter of the company declare this to be a public act throughout, and the representatives of the stock owned by three sovereign republics sit as directors at the council board of this company.

No corporation connected with a business subject could be more completely a public corporation than this is. Not only is it a corporation to promote public ends, but it is also international in its scope and purposes, and nearly municipal in its authority over a neutral zone in Nicaragua and Costa Rica, fixed by the concessions, and supported by grants of authority that affect all maritime nations.

No diplomatic relation of the United States is in the least degree affected by its participation in the promotion, assistance, and control of the Maritime Canal Company of Nicaragau, under the provisions of the bill as it is now reported to the Senate.

Our powers in Panama for the protection of the isthmian transit are not greater than those guaranteed to the United States in our treaty with Nicaragua for the protection of a canal through the territory of that Republic.

Under such authority, the United States has, on several occasions, landed troops at Panama to protect the railway across the isthmus, built by citizens of the United States under a charter granted by New York. This incursion of military forces into Panama has created no friction and has not excited any feeling of uneasiness there or in any other quarter.

The attitude in which the United States is placed, in respect of this canal, and as it is defined in the bill now reported to the Senate, is in accordance with all of our treaty rights and obligations with all countries, and it can not be a just cause of uneasiness to any power in the world.

All commercial nations are deeply interested in this canal, and none of them have intimated a doubt as to the faithful observance on the part of the United States of the limitations contained in the concessions of Nicaragua and Costa Rica for this waterway of nations.

It would be idle for us to hunt for objections where none exist on the part of other nations to our close relations with this canal company. It has been more than five years since Congress, through one of the committees of the Senate, began to deal with this canal in a serious way, and during all of that period the work on the canal has been steadily progressing under the charter which is proposed to be amended by this act.

Ample time and opportunity has been given to other nations to make objections to any action of the Government of the United States in relation to the canal, if any objection has ever been contemplated by them. All this business has been transacted without the least effort at concealment. The committee have not found any embarrassment to this work in our relations with foreign countries. On the contrary, every treaty we have, that relates to the canal, provides for and supports the attitude in which the bill now reported places the United States in reference to this great international work.

STOCKS AND BONDS OUTSTANDING.

The bill herewith reported to the Senate deals exclusively with the Maritime Canal Company of Nicaragua, an organization that is expressly provided for in the concessions of Nicaragua and Costa Rica, and is therein distinctly forecast as the protegé of the United States.

The bill requires that all outstanding stocks issued and obligations for the issue of stocks or bonds shall be canceled, and all existing debts and demands against the company shall be extinguished, and all contracts for work to be done, or materials to be furnished, shall be taken up before this act shall take effect, so as to have the company free of all debts and demands at the time of its reorganization under this act.

The Secretary of the Treasury is empowered to render a final decision as to all sums to be paid to the Maritime Company for its property and to enable it to pay its outstanding debts and obligations. The stock liabilities and the concessions, with all their incidents and all outstanding obligations for the delivery of bonds of the company, are to be paid for in the stock of the company, not to exceed $7,000,000, or such smaller amount as the Secretary of the Treasury shall determine to be just and equitable.

On the faith of these obligations and stocks, the construction company, which was employed to complete the canal at a total cost of $220,000,000, in the stock and bonds of the Maritime Company, advanced and expended in surveys, plant, machinery, materials, labor, and salaries, with interest, a sum of money alleged to be equal to $4,500,000.

This bill requires the Secretary of the Treasury to state an account with the Maritime Canal Company, as to all the items of these cash expenditures and to determine, finally, the amount thereof, and to deliver the bonds of the company guaranteed by the United States, to an amount equal to the sum so ascertained and determined, not to exceed $4,500,000, and to have the same applied to the liquidation and extin-

guishment of all demands upon the company for such cash expenditures. In explanation of the actual situation of the Maritime Company, with reference to these matters, the attorney of that company submitted to the committee the following:

STATEMENT.

"The bill provides that the Maritime Canal Company shall have not exceeding $4,500,000 in guarantied bonds, and not more than $7,000,000 in stock, with which to call in and cancel the following securities issued by it from time to time, to wit:

Stock issued to subscribers for cash, $1,014,500.
Stock paid for concessions, $12,000,000.
Stock paid for work, $3,504,900.
Scrip issued for bonds paid for work, $6,855,000.
In all, $23,374,400.

"In addition to the redemption of these stocks and outstanding obligations for stock and bonds the Maritime Company is required to procure the construction company to the cancellation of the contract of January 3, 1890, its most valuable asset.

"To carry out the above requirements the consent of the construction company and of its stockholders, as well as that of the other persons holding securities of the Maritime Canal Company, must be obtained before the provisions of the bill can be carried into effect.

"The bulk of the securities to be redeemed are now held by the construction company, but about $1,300,000 of the stock of the Maritime Company and $1,300,000 of obligations for Maritime Company bonds are held by persons not connected with the companies, who are not likely to part with the same for less than par, no matter how much less they paid for them.

"The stockholders of the construction company will doubtless consent to any fair and equitable provision which will give them a fair return upon their investment. The construction company has raised and expended, under its contract with the Maritime Canal Company, about $4,451,568, which represents about $4,404,900 of Maritime Company stock and about $6,855,000 of Maritime Company bonds to be issued to them. One million dollars of the stock of the Maritime Company was sold to the construction company for cash, at par, and the balance of said securities were issued, or agreed to be issued, under the contract with the construction company for building the canal, of date January 3, 1890.

"In addition to these amounts the construction company acquired $12,000,000 of maritime company stock in payment for the concessions. This amount included the $6,000,000 of stock to which the promoters are entitled under the concession from Nicaragua.

"If this bill becomes a law, and if the Secretary of the Treasury, under its provisions, so decides, the Maritime Company would have $4,500,000 in bonds with which to pay its cash obligations, resulting from the recision of the contract with the construction company, for completing the canal, and $7,000,000, in stocks, to redeem $6,855,000 of its obligations for bonds.

"Of this sum, $1,300,000, or thereabouts, are in the hands of the public and can only be redeemed at par.

"The stockholders of the construction company, in consenting to surrender for cancellation the securities held in their treasury, would, therefore, probably receive no more than $3,200,000 in cash for $4,451,568 expended on the canal work, and $5,700,000 in stock for their

concession sold to the Maritime Canal Company. The construction company, in order to raise money to work on the canal, had to sell the securities paid to them by the Maritime Company at much less than par, so that the sum realized from their sale is much less than they will have to pay for their redemption, and they must, therefore, sustain a heavy loss on the whole transaction. It is equally obvious that the Maritime Company must be in a position to do equal justice to all the holders of its securities without distinction, in order to call them in and cancel them, as is required in the bill to be reported to the Senate."

The difficulties to be met in this reorganization of the Maritime Canal Company under this proposed amendment to its original charter have been very great, and involve very considerable sacrifices on the part of the company as it is at present organized, but the committee are assured that all that is required in this bill will be speedily accomplished.

A company that is willing to accept this pittance of stock and bonds for the valuable rights and concessions thus placed within the power of Congress, involving a large loss to individuals, is entitled to credit for something more worthy of their enterprising and patriotic spirit than to be regarded as a body of adventurers anxious to get rid of a bankrupt concern.

The concession of 70 per cent of paid up stock to the United States, when the present owners get not exceeding 7 per cent, is not a very slight matter, at least to them.

Under their concession from Nicaragua they are entitled to $6,000,000 paid up stock, all of which they surrender in order to get $7,000,000 of stock with which to free the Company of all stock already issued and all outstanding obligations for bonds and stock, amounting to over $16,000,000.

CONCLUSIONS.

In view of these facts, and of the certainty that the property of the Maritime Canal Company is of immense value and can be sold to foreign syndicates at a sum far greater than is provided in this bill, the committee feel constrained to declare that, in their opinion, the conduct of all who are financially interested in the canal and concerned in the effort to place this subject under the control of Congress is free from selfish purposes, and is honorable to them, and is entitled to be regarded as a patriotic sacrifice on their part.

This bill provides for the guaranty of $70,000,000 of bonds of the Maritime Company, bearing 3 per cent interest, payable quarterly, the principal to fall due in not less than ten, nor more than thirty years. This reduction of the amount of bonds to be guaranteed, below the $100,000,000 provided in the previous reports of the committee, is in nearer accord with the estimated cost of the canal, and it leaves 70 per cent of the entire capital stock of the company in the ownership of the United States, and 16½ per cent in the treasury of the company; to all of which resort may be had, in case of necessity to raise any additional sum, if any is required, to complete the canal.

The safeguards provided in this bill to prevent any possible injury to the United States that is within reach of the most cautious forecast, are chiefly as follows:

1. The United States, at all times and in all conditions of the company, is to appoint ten of the fifteen members of the board of directors,

and all the expenditures and operations of the company are to be under the general supervision of the Secretary of the Treasury.

2. The President may, at any time prior to July 1, 1897, suspend the issue of guaranteed bonds until Congress shall otherwise direct. After that time the condition of the work will, it is believed, be so far advanced, and its practicability will be so well established, that this authority will no longer be useful.

3. The power of foreclosing the mortgage of the company, by sale, upon the order of the President and without judicial proceedings, is a reservation of the means of summary disposal of the mortgaged estate, that may be found useful.

4. The President may, in his discretion, appoint a board of three engineers, to inspect the canal and everything connected with it, before any bonds are issued under this act.

5. All work on the canal as it progresses is to be examined by inspectors appointed by the President of the United States, who shall certify quarterly to its actual cost, before any guaranteed bonds are delivered to the company in payment for it.

6. No money raised by the sale of bonds or stock of the company shall be applied otherwise than to the cost of the construction and equipment of the canal.

These general safeguards, provided to insure careful progress, faithful administration, and honest conduct on the part of all persons who may be connected with the work of building the canal, are supplemented by other provisions of like character relating to the details of the plan and purposes of this act.

The present moment seems propitious for opening this waterway that is indispensable to our physical and political geography, and to the proper care of the Government for the protection and prosperity of our Pacific coasts.

The plan and certain effect of this bill, if it becomes a law, will be to put into active business employment $100,000,000 of money borrowed from our own people, without risk to the Government. Such a movement at this time would stir all industries into activity and release other hundreds of millions of dollars that are now being hoarded or employed in gambling in stocks. It would furnish good and wholesome employment to 50,000 Americans that are marching on the highways, begging for work and often for food.

It would yield to the United States, at the rate of one dollar per ton for canal charges, not less than $4,000,000 per annum of dividends on its $70,000,000 of stock in the canal.

With this fund, if so applied, we could grant, or pay, to our coastwise navigators the full amount of tolls they would have to pay to the canal. Or, if we chose, we could, with these earnings, build a ship canal for military and commercial purposes to connect the Great Lakes with the Gulf of Mexico, through the Mississippi River.

If we can afford to pay interest on $100,000,000, locked up in the Treasury to protect our national credit, we could even better afford, if that was a necessary result, to pay interest on $70,000,000 to save to our commerce between the Atlantic and Pacific States the average distance of 10,000 miles, in every voyage, and the crossing of the torrid zone twice in the journey, going out, and twice on the return trip, and the passage through the dreadful seas of the Antarctic Ocean.

The committee adheres to the estimate of the annual earnings of the Nicaraguan Canal, made in their former reports, as the minimum sum that will probably be realized from tonnage tolls and passengers, although

the facts now in view indicate a much larger sum than $9,000,000, at the rate of $1 per ton, while the Suez rate is more than $2 per ton. This would pay 3 per cent interest on $70,000,000, amounting to $2,100,000, and cost of maintenance and current expenses $3,000,000, and would leave for dividends $3,900,000, of which seven-tenths would belong to the United States.

EXHIBIT 1.

[Senate Ex. Doc. No. 1, Fifty-second Congress, second session.]

LETTER FROM THE SECRETARY OF THE INTERIOR, TRANSMITTING THE ORIGINAL REPORT OF THE MARITIME CANAL COMPANY OF NICARAGUA.

DEPARTMENT OF THE INTERIOR,
Washington, December 5, 1892.

SIR: I have the honor to transmit herewith for the information of the Senate the original report of the Maritime Canal Company of Nicaragua, submitted to this Department this day, in accordance with section 6 of the act of Congress approved February 20, 1889, entitled "An act to incorporate the Maritime Canal Company of Nicaragua."

Very respectfully,

JOHN W. NOBLE,
Secretary.

The PRESIDENT OF THE SENATE.

THE ANNUAL REPORT OF THE MARITIME CANAL COMPANY OF NICARAGUA.

The SECRETARY OF THE INTERIOR:

SIR: Pursuant to section 6 of the act entitled "An act to incorporate The Maritime Canal Company of Nicaragua," approved February 20, 1889, which provides that said company shall make a report on the first Monday of December in each year to the Secretary of the Interior, and in accordance with the instructions received from you prescribing the form of such report and the particulars to be given thereby, the said Maritime Canal Company of Nicaragua hereby reports as follows:

First. That the regular annual meeting of the company was held at No. 44 Wall street, in the city of New York, on the 3d day of May, 1892, pursuant to the provisions of the by-laws, and that at such meeting Messrs. Charles P. Daly, Daniel Ammen, Horace L. Hotchkiss, Henry E. Howland, and James B. Eustis were duly elected directors of said company to fill the places made vacant by the class whose term of office expired on the said 3d day of May, 1892, and to serve for the period of three years, as provided for in the said act of incorporation.

Second. That the board of directors of said company, as now constituted, is composed of the following stockholders:

Class of 1893.—Joseph Bryan, James Roosevelt, Hiram Hitchcock, Thomas B. Atkins, and Horatio Guzmán (Nicaraguan director).

Class of 1894.—Alfred B. Darling, Franklin Fairbanks, C. Ridgley Goodwin and Alexander T. Mason.

Class of 1895.—Charles P. Daly, Daniel Ammen, Horace L. Hotchkiss, Henry E. Howland, and James B. Eustis.

A majority of the above-named directors are citizens and residents of the United States. The vacancy existing in the class of 1894 has not yet been filled.

Third. That at the first meeting of the board of directors held after the said annual election, the following officers were duly elected to serve for the ensuing year, to wit: President, Hiram Hitchcock; vice-president, Charles P. Daly; secretary and treasurer, Thomas B. Atkins. All of the officers so elected are citizens and residents of the United States. That at said meeting the following directors were elected members of the executive committee, as provided for in the by-laws of said company, to wit: James Roosevelt, chairman; Hiram Hitchcock, Horace L. Hotchkiss, C. Ridgley Goodwin, and Alexander T. Mason.

Fourth. That the interests of this company are at present represented in the Republic of Nicaragua by Mr. Gonzalez Espinosa, as resident agent at Managua; while Mr. Louis Chable represents the corporation in a similar capacity at San Jose, in the Republic of Costa Rica.

Fifth. That on the 11th day of December, 1889, in accordance with the provisions of section 1 of the said act of incorporation, a certificate of the appointment of Messrs. Daly, Hoyt & Mason, counselors at law, of No 44 Wall street, in the city of New York, as the attorneys of the Maritime Canal Company of Nicaragua, was duly made by the president of the company and filed in the office of the Secretary of State of the United States, and said firm are still the legal representatives of said corporation.

Sixth. That since the organization of the Maritime Canal Company of Nicaragua 10,145 shares of the capital stock of said company have been subscribed for at par, amounting in the aggregate to the sum of $1,014,500, of which amount $1,001,450 have been paid into the treasury in cash; that there has been paid into the treasury from other sources $39,299.70, making the total amount of cash received $1,040,749.70; that the other assets of the company consist of its capital stock, of the concessions, rights, privileges, and franchises which it now owns, and of the plant, equipments, materials, lands, buildings, structures, railways, steamboats, telephone and telegraph lines, dredges, locomotives, cars, machinery, stores, machine shops, supplies, and other property in Central America, including the lands situated between the lake and the Pacific, which we purchased from the Government of Nicaragua for the route of the canal, at a cost of $50,000, in accordance with the provisions of the Nicaraguan concession.

Seventh. That since the organization of the company it has paid for property, work and labor done, and materials furnished in the execution of the work of constructing the canal and in administration expenses, the sum of $815,649.63 in cash and 31,990 shares of the full-paid capital stock of the company of the par value of $3,199,000, and is obligated for $6,855,000 of its first-mortgage bonds. It has also issued 180,000 shares of its capital stock of the par value of $18,000,000 in payment for concessionary rights, privileges, franchises, and other property.

Eighth. That the liabilities of the company consist of the amounts still due under the concessions granted to the company; of the $6,855,000 of bonds before mentioned, the said bonds being due to the Nicaragua Canal Construction Company for work and labor done and materials furnished in the execution of the work of constructing the Interoceanic Canal, and of cash liabilities outstanding and unpaid to an amount not exceeding $50,000.

Ninth. That while the work of actual construction was not formally inaugurated until the 8th day of October, 1889, preliminary work on the canal was commenced on the 3d day of June of that year, since which time operations have been prosecuted with diligence and energy. The following statement covers the period that has elapsed since the last-mentioned date and shows what has been accomplished by the company in Nicaragua since the inception of the canal work up to the time of this report.

The axial and detailed surveys of the proposed interoceanic canal, its harbors, locks, and other accessory work, were completed early in the spring of 1889, and the final location of the route from ocean to ocean practically determined. Several months elapsed after the completion of this work before the voluminous plans and drawings prepared by the company were approved by the Government of Nicaragua and the formal commencement of construction authorized, during which time a corps of engineers was kept constantly employed and much valuable preparatory work was done, such as the commencement of the erection of permanent quarters, wharves, storehouses, clearing the ground, and accumulating supplies, tools, machinery, etc.

The necessity of securing a safe entrance from the Atlantic to the old port (which, until 1860, was easily accessible to vessels of upward of 20-foot draft) was realized as indispensible to economical and rapid progress, and therefore the first work of actual construction was in execution of the engineers' plans for restoring the harbor. One of the means to accomplish this end was the erection of a breakwater to protect the entrance. This massive work, which will ultimately absorb much of the rock excavated from the divide cut, has been pushed out about 1,000 feet and has been filled in with brush mattresses, rock, and hydraulic-cement concrete. Quarters for accommodation of the workmen and storage for supplies were erected near this work, and a railroad track has been laid upon the breakwater and extended landward to facilitate the handling of building material and other supplies. In the framework of this breakwater creosoted piling only was used, as the marine worm soon destroys unprotected wood. The filling placed within and beneath the heavy creosoted timber framework forms a solid mass of what would otherwise be insufficiently protected from injury by the elements and by the teredo. The bar in front of the old San Juan harbor has, since 1860, been one of the most difficult on the coast.

The breakwater was constructed from the beach to and across this bar, and although it encountered the full force of the waves, it was carried forward through the heavy surf without interruption on account of the weather and without accident of any kind. As it advanced it afforded a partial shelter to the beach to lee-

ward and also served as a barrier to the moving sand, which, impelled by the currents and prevailing winds and driven constantly to the westward, built up and maintained the sand spit that thirty years ago closed the old port of San Juan. This artificial interruption to the operation of the winds and current permitted countervailing forces of nature to come into play, so that by the time the pier had been pushed out 600 feet the sand beach under its lee was swept away and a channel formed communicating from the open ocean to the old harbor and restoring it to the extent of permitting the entrance of light-draft seagoing vessels at a point where, six months before, there was a sand bank 3 or 4 feet above the sea level. The attainment of this result was without the assistance of any dredge or any artificial aid other than that afforded by the breakwater.

It is evident from this experience that the plan of the engineers for the restoration of the port of San Juan is not only theoretically sound, but practicable. The building of the pier has steadily progressed as materials were available, and its total length, as already stated, is now over 1,000 feet. The depth of the channel under the lee of the pier reached 10 feet when the structure had been extended 800 feet. In the winter of 1890–'91 a dredge increased this depth to about 15 feet, which has since been maintained, except in restricted areas, which are easily deepened by dredging. The first deep-sea vessel to enter the restored harbor was the steamer *Sverdrup*, with a cargo of machinery, etc., on the 7th of January, 1891, and since then many other vessels have frequented the port.

The construction of permanent buildings was begun in the summer of 1889 and has been in progress ever since. The completed structures are all of wood (pine from the United States) and are roofed with corrugated galvanized iron. The offices, quarters, and hospitals are neat and comfortable, being ceiled and painted and provided with wide verandas outside. The permanent buildings thus far erected are in the immediate vicinity of San Juan, where the general headquarters are located and where the most important operations have been concentrated. They consist of five groups, covering an area of about $1\frac{3}{4}$ acres, and have a floor space as stated below:

	Square feet.
Headquarters	13,986
Hospital	14,174
La Fé depot	21,864
Railroad headquarters	18,778
Camp Cheney	7,100
Total	75,902

Besides the above, numerous and extensive wharves equipped for unloading freight, sheds, small outhouses, water tanks, etc., have been constructed. The machine and smith's shops are equipped with a varied and extensive assortment of modern tools. A tramway connects the more important of these establishments.

Work in clearing the canal line of forest growth was begun near Greytown in January, 1890, and for a distance of about 10 miles back from the coast a clearing has been made of 486 feet in width. Similar work was commenced on the west side of Lake Nicaragua in the month of November, 1890, and for 9 miles the ground there is ready for construction work.

A telegraph line to the interior, connecting with the telegraph systems of the country and the ocean cables, was one of the first works commenced, and it was soon pushed through to Castillo, covering with its loops a distance of 60 miles. For the first 10 miles the line ran across a very difficult swamp, where the work was most arduous; the poles of native timber were difficult of procurement; and, together with all other supplies, had to be carried to where they were needed by men wading in water from 2 to 4 feet in depth. In some places the water was so deep that the poles could not be set in the earth at all, and in such cases they were secured to tree stumps, and otherwise supported by wire guys. Through the hill country the line was not only an expensive one to build, but is difficult to maintain, and to protect the wires and poles from damage by falling timber it was necessary to make a clearing of the forest along the line to a width of about 100 feet. In addition to this telegraph service, all the offices and the more important camps and stations are now also in telephonic communication.

As the heaviest single body of work to be accomplished on the whole line is concentrated within a distance of 3 miles at the rock-cutting, "The Eastern Divide," and as the time required to complete the canal will necessarily be measured by the time spent in opening this deep cut, it was considered important to install a plant for the work at the earliest date possible. The difficulties of transporting to the Divide the quantity of machinery, etc., needed for the heavy rock-cutting to be done at that point made requisite the immediate construction of a railroad. This work was commenced in the summer of 1890 and has been pushed forward with marked success. The line traverses what had always been considered an impassable swamp,

and for the first 10 miles there are but 4 miles of hard ground. Soon after beginning the roadbed heavy rains set in and the swamp was flooded to a depth of from 1 to 4 feet. All the earth used for filling had to be brought from a distance by construction trains, which necessitated laying the track first and making the required embankment afterward.

To accomplish this, a heavy corduroy of logs was laid for many miles. These logs, which were procured from the neighboring forest, were rolled, floated, or dragged by man power alone to the line of the proposed track, and there laid transversely as compactly as possible. Upon them were placed longitudinal stringers, consisting of native tree trunks, on which the railroad ties were laid, and upon these the steel rails were then spiked down. Trains loaded with sand were run out over the structure and the sand dumped and packed into the interstices and under the ties, which were raised gradually by the workmen until the desired grade was secured. There were 6 miles in all of this construction through swamps, the men working most of the time in water reaching above the knees and often to the waist or armpits. The material used for grading and ballasting the first 8 miles of the roadbed was taken from the canal prism, near the harbor, and distributed along the line by construction trains, the cars being loaded by means of a steam shovel or navvy, capable of delivering 1,300 cubic yards per day.

There are several places along the railway where streams and other water courses are crossed. These are spanned by pile bridges, and a powerful steam pile-driver has been used in their construction. The portion of road already completed is the most difficult of the whole line, and but 7 miles now remain to be built to reach the Eastern Divide. There are several miles of side track, switches, etc., already in place, and the road is equipped for construction work with 4 locomotives, 50 cars, steam shovel, ballast-unloader, and all other requisite appliances. All the crossties and bridge timbers are of Northern pine, charged with 16 pounds creosote oil to the cubic foot. At the terminus on the harbor is a fine wharf, 264 feet long, built in the best manner of creosoted timber, and equipped with modern steam conveniences for handling freight rapidly. The survey for the remainder of the line, extending to the San Juan River at Ochoa, has been completed; in fact, two locations have been surveyed and profiles prepared in sufficient detail to permit accurate estimates of cost. Between Lake Nicaragua and the Pacific the railroad line is also located, and everything made ready for its construction, which must necessarily precede the inauguration upon a larger scale of the work of excavation.

In the summer of 1890 there was purchased from the American Contracting and Dredging Company the extensive and valuable plant used so successfully on the eastern end of the Panama Canal from the year 1881 to the callapse of that enterprise in 1888. The property consisted of seven dredges, the most powerful ever built, two fine tugboats, twenty lighters, several launches, the equipment of an entire machine shop, stationary engines, pumps, and a vast quantity of tools, spare parts, materials for repairs, etc. Many of the articles are in quantities which will suffice until the completion of the Nicaragua Canal.

During the autumn of 1890 this dredging plant was transferred to San Juan del Norte, where portions of it were immediately equipped for work, and three of the dredges have since been in use for various periods, upon the canal proper, in the harbor, and in the entrance channel leading thereto. Dredging on the canal line west of the harbor has uninterruptedly been carried forward and a point well inland has been reached, by an open channel 17 feet deep and varying in width from 150 to 230 feet, which drains the swamp and lowers the level of the swamp waters, thereby securing for the railroad embankment immunity from injury by flood waters. No obstructions to free dredging have been encountered so far, although the canal has now been opened for a distance of about 8,750 feet. A powerful seagoing suction dredge for deepening the channel across the bar has been constructed in Scotland for the company and is now ready to be sent to its destination.

The floating plant has been kept in repair, and the buildings, offices, quarters, and hospitals maintained in good condition, while the equipment of the machine shops is being increased as there is need.

All the engineers employed on the line have been and are of known and tried ability. Those in positions of chief responsibility have had extensive practice in works of engineering construction in the United States and the tropics. The engineers, administrative staff, surveyors, and nearly all the skilled mechanics have been hired in the United States and sent out under contract for at least a year's service, and several have been continuously employed in Nicaragua for upwards of three years. Natives of Central America and negroes from the island of Jamaica have been employed for unskilled labor, and all employés have been not only housed and fed by the company, but also supplied with medicine and hospital attendance. The rate of wages paid to ordinary laborers varies from 20 to 30 soles per month, and it is evident from past experience that an abundance of acclimated labor, entirely adapted to the company's needs, is readily obtainable from the localities named.

No Chinese or other Asiatic workmen have been employed, nor will such be used upon the work in the future.

In the location of the canal line the route chosen from among the many tentative lines run was that which presented the fewest difficulties. No change from the location first decided upon has since been made, except as further examination and studies have demonstrated the certainty of betterments, either by shortening the length or decreasing the difficulties and cost of construction. During the past year one or more parties of engineers have been constantly in the field engaged in critical examination of the topography at certain localities where previous surveys had suggested that betterments in the location or design might be practicable. In some cases, after very close examination and study, their hopes proved unrealizable, but in one instance instrumental examinations have completely demonstrated not only the practicability, but the economy to result from a rectification of the line. The location previously adopted between the sites of Locks Nos. 2 and 3 involved a curve of large radius in the sailing line through the second Deseado basin. It is now discovered that this curve may be eliminated, with a saving in distance of upwards of 1,000 feet and a saving in earth excavation of upwards of 600,000 cubic yards.

A site for the Ochoa Dam has been located about a half mile below that originally chosen; should the borings yet to be made at this locality prove its suitability of foundation, without material increase of cost over that already assigned in the estimates, another curve in the sailing line may be eliminated and a large reduction in mass of excavation will be possible. A party of engineers has been for many months engaged in boring the strata at the proposed site of La Flor Dam, which is located about 3 miles from the Pacific terminus. Although their work at last advices had not been completed, yet the results already known demonstrate the certainty of securing a solid rock foundation for the dam and for the locks which are to be built at this point. This existence of a solid foundation of homogeneous limestone at an inconsiderable depth is regarded as very important, for it will permit the construction of a dam of less mass than would have been required on the clay foundation contemplated before the deep borings with the diamond drill had been made.

A party of engineers was also engaged for many weeks in further surveys for the minor canal required under the concession to be built between Lake Nicaragua and Lake Managua, for steamboat navigation, known as the Tipitapa Canal. This work, which is not of large magnitude, has now been so thoroughly studied that plans can be prepared for construction and everything made ready for its speedy completion within a short time.

At the Machuca Rapids, in the San Juan River, a considerable mass of rock has been removed, improving the navigability of the river at this point.

About two years have elapsed since the old port was reopened, and the correctness of the theories upon which the works for reopening and maintaining the harbor and its entrance were based has been thoroughly demonstrated to the satisfaction of the engineers. Hydrographic parties have been kept constantly at work, adding to their previous knowledge of tidal and other currents and in the preparation of charts showing the effect of the works of construction upon the coast line and the harbor.

In March, 1891, the Hon. Warner Miller, president of the Nicaragua Canal Construction Company, accompanied by a large staff, visited the Republic of Nicaragua and made a complete and thorough examination of the entire line of the canal and of the numerous works connected with the construction thereof. The reports received from this expedition were most gratifying, and showed that the work then accomplished had been done in a systematic manner, with all possible care, thoroughness, and dispatch, and within the estimates of the engineers.

In addition to the results already achieved, as hereinbefore set forth, the company has organized and established in Nicaragua a complete hospital service and has perfected the sanitary arrangements in and about its camps and headquarters. In the early part of 1889 the medical work was carried on by assistant surgeons located at different points along the canal route, but the department was not regularly organized until October of that year, when a chief surgeon was appointed and the hospital at headquarters was virtually completed and made ready for occupation.

This hospital at present consists of thirteen buildings, of which five are two-story structures surrounded by broad verandas. The remaining buildings of the group are one-story structures, for the most part built of wood. The total capacity of the hospital is 125 beds. It is situated on the beach, about 500 feet from the surf, and is equipped with a first-class pharmacy and operating room. Owing to the mildness of the climate, it is possible to provide perfect ventilation with a smaller number of cubic feet for each patient than would be considered necessary in a colder climate. In 1890 it was found necessary to erect, 8 miles up the railway line, at Camp Perez, a temporary hospital, known as temporary hospital No. 1, accommodating about 50 patients. This hospital consists of one large building, containing, in addition to the general laborers' ward, a pharmacy and nurses' room. A second building was

erected for culinary purposes. Medical stations have been established and operated at different times at points remote from the hospitals, according to the necessities of the work.

During the time covered by this report stations have been established at Camp Francis, on the beach; Carazo, on the San Juan River; Poco-Mas-Arriba; Satisfaction, on the Deseado River; Lake Silico; San Francisco River, and at Railway Camp No. 1. These stations are all on the Atlantic division. On the Pacific division stations have been operated at different times at Rivas and Tipitapa. In connection with headquarters hospital, an efficient ambulance service has been maintained since the fall of 1889. The company has also operated a road ambulance to stations on the beach and a car ambulance between the hospital and La Fé, at which latter place connections were made with the railway terminus, the navigation docks, and the breakwater. On the railway line an ambulance caboose car has been in use since the summer of 1891.

Every possible precaution against the development of disease among the company's employés has been observed, such as watching for and removing all local causes and preventing, as far as possible, the entrance into camps from outside sources of the germs of contagious or epidemic diseases, and by an efficient quarantine service. Every surgeon, in his section, exercises the duties of a sanitary inspector and reports to the chief surgeon any necessary changes in the camps or other surroundings. A supervision of the food furnished employés and the mode of its preparation is maintained. When a new camp is built the surgeon of the station inspects the location and surroundings and sees that hygienic rules are observed in its location and construction. The station surgeon reports every ten days upon the sanitary condition of all camps in his station.

Another method employed for prevention of disease among the company's employés has been a thorough physical examination of all laborers seeking to enter the service. It is easier to prevent the entrance of disease than to eradicate it when once lodged, and the advantage of this practice has been proven by the considerable decrease in the percentage of sickness among employés since the adoption of the rules. The staff of surgeons necessary to carry out the complete and careful scheme of work inaugurated by the company has been regulated in number by the character of the work, number of employés, relative distance of camps, and methods of transportation.

There have been in the employ of the company since 1889, 1 chief surgeon and 10 assistant surgeons; also, 1 druggist and 2 assistant druggists. The other employés, including nurses, orderlies, cooks, ambulance men, etc., have varied in number from 20 to 30. There have been treated in the hospitals of the company during the past three years 2,364 patients. The total number of deaths was 35, making a total death rate of 1·48 per cent of cases treated. These deaths, however, include not only those due to climatic diseases, but also to accidents and chronic diseases among employés admitted to the company's service before the rules for a physical examination were adopted. The total number of deaths due to diseases that may be termed climatic were 17, or 0·72 per cent. From this record it will be seen that any existing opinion regarding the unhealthfulness of the climate in Nicaragua is erroneous. Far removed from the severity of the Northern winters, though geographically in the tropics, the temperature is moderate and equable throughout the whole year. The northeast trade winds temper the atmosphere and have a marked influence.

The mean temperature during 1890 was 77·25° F. In 1891 there was an extreme range of 28° from a minimum of 67° to a maximum of 95°, or a mean of 81° F. This difference of mean temperature was probably due to the decrease of the annual rainfall. It has been asserted that the country teems with fatal maladies and that the canal employés would be exposed to severe types of fever as soon as the work of excavation was commenced. This, however, has not proved to be the case, as an examination of the records and statistics kept by the medical department will show. The dredges have already advanced over a mile into the swamps without encountering anything but sand and light loam, which, exposed to the sun, produces no unusual sickness, and the borings prove that the soil as far as the foothills or the entire width of the swamp lands is of a similar character. Most of the diseases met with have been mild in type. This is especially true of bronchitis and pneumonia. The cases of fever are of the remittent or intermittent type, very amenable to treatment, and not of as long duration as in the United States.

No epidemic disease has visited the country since the work was begun, and the occasional reports which have been published in the daily press were without any foundation in fact. Chagres fever is entirely unknown as an epidemic disease, and in 1890, when a number of cases were brought on towing steamers in the service of the company from Colon to Nicaragua, every one taken to the canal hospital recovered, while of those admitted from the same ships to the Colon hospital a number died.

For the accommodation of a working force of 10,000 men there will be required two general hospitals of 150 beds each for both officers and men, resembling very closely the present headquarters hospital, and two of 100 beds each for laborers, the general hospitals being located, one at the eastern end, the other near the western end of the canal, and the laborers' hospitals at convenient points along the line. These will provide 50 beds per thousand men, which will be ample, excepting in case of an epidemic, when it would be necessary to erect temporary hospitals wherever needed. A field equipment for a couple of temporary hospitals which could be used in the event of such an emergency could be kept constantly on hand. A properly arranged ambulance department, developed from the present nucleus, and a druggist department similiarly developed fom the central store, with a pharmacy connected with each hospital, are all provided for in the general plans, which are already to be put into operation as soon as a larger development of the work of construction is determined upon.

In conclusion, it is proper to say that the medical organization and the system of sanitation inaugurated by the company has proved itself to be exceedingly valuable in maintaining a death rate which is not only very greatly below that of any other known large work of construction in its hospital records, but also is very materially below the death rates of hospitals in the United States, as the following figures will show: In 1890, at the New York Presbyterian Hospital, the death rate was 10·73 per cent; in the Roosevelt Hospital, New York, it was 9·76 per cent; and in the Orange Memorial Hospital it was 7·88 per cent, while in headquarters hospital of the canal company it was only 1·38 per cent. The system which has operated with such exceptional results during the last three years may reasonably be expected to work as satisfactorily in its extension.

The company has gone to its work of building the canal in a plain, unostentatious, systematic manner, and although nearly all accomplished to date may be described as preliminary work only, yet a very important advance has been made. The results may be summarized as follows:

WORK ACCOMPLISHED.

(1) The prosecution of the final surveys for location and construction and surveys for economical improvements as to details.

(2) The subterranean examinations of the strata requiring removal by means of borings with the diamond drill.

(3) The restoration of the harbor of San Juan del Norte to the extent of securing an easy entrance to the port for vessels of moderate draft.

(4) The construction of extensive wharves and landing facilities.

(5) The erection of permanent buildings for offices, quarters, hospitals, storehouses, shops, etc., having a floor area of an acre and three-fourths.

(6) The building of a large number of temporary camps along the line for accomodation of employés.

(7) The completion of a telegraph line permitting ready communication with the work.

(8) The clearing of the canal line of timber for some 20 miles.

(9) The completion of surveys for location and of plans for construction of the railroad system, and the construction and equipment of 11 miles of this line.

(10) The acquisition by purchase of the most valuable and powerful dredging plant to be found in America under one management.

(11) The fitting up and operation of this plant and the opening of over a mile of the canal.

(12) The acquirement by purchase of the valuable and exclusive franchise for the steam navigation of the San Juan River and Lake, together with the extensive plant of the navigation company, consisting of offices, lands, steamboats, tugs, lighters, repair shops, etc.

(13) And lastly, what is felt to be the most important result of all is the demonstration, secured by experience, of the salubrity of the climate, the efficiency of labor, and the sufficiency of the estimates of the chief engineer for the harbor and canal dredging and railroad work.

The Government of Nicaragua, by a communication dated November 8, 1890, has officially recognized and declared that the company has more than complied with the provisions of article 47 of the concession, requiring the expenditure of $2,000,000 during the first year of the work. This formal acknowledgment confirms the company's title to the concessionary rights for a term of ten years in which to complete the canal.

A detailed description of the proposed canal and the work to be accomplished in its construction, together with the maps showing the route thereof as the same has been finally located, was annexed to the annual report of the company for the year 1890, to which reference is hereby made for said particulars.

In witness whereof the Maritime Canal Company of Nicaragua has caused its corporate seal to be hereunto affixed and these presents to be signed by its president and secretary, this 3d day of December, A. D. 1892.

THE MARITIME CANAL COMPANY OF NICARAGUA,
By HIRAM HITCHCOCK,
President.

[SEAL.]

THOS. B. ATKINS,
Secretary.

STATE OF NEW YORK, *city and county of New York, ss:*

Hiram Hitchcock, being duly sworn, says: That he is the president of the said The Maritime Canal Company of Nicaragua; that he has read the foregoing annual report and knows the contents thereof, and that the same is in all respects correct and true.

HIRAM HITCHCOCK.

Sworn to before me this 3d day of December, 1892.
[SEAL.]

V. BIGELOW,
Notary Public, New York County.

STATE OF NEW YORK, *city and county of New York, ss:*

Thomas B. Atkins, being duly sworn, says: That he is the secretary of the said The Maritime Canal Company of Nicaragua; that he has read the foregoing annual report and knows the contents thereof, and that the same is in all respects correct and true.

THOS. B. ATKINS.

Sworn to before me this 3d day of December, 1892.
[SEAL.]

V. BIGELOW,
Notary Public, New York County

STATE OF NEW YORK, *City and County of New York, ss:*

On the 3d day of December, 1892, before me personally came Thomas B. Atkins, known to me to be the secretary of The Maritime Canal Company of Nicaragua, and with whom I am personally acquainted, who, being by me duly sworn, did depose and say: That he resided in the city of New York; that he was the secretary of the Maritime Canal Company of Nicaragua; that he knew the corporate seal of said company; that the seal affixed to the foregoing report was such corporate seal; that it was so affixed by the order of the board of directors of said company, and that he signed his name thereto by the like order as secretary of the said company.

And the said Thomas B. Atkins further said that he was acquainted with Hiram Hitchcock and knew him to be the president of said company; that the signature of the said Hiram Hitchcock subscribed to the said instrument was in the genuine handwriting of the said Hiram Hitchcock and was thereto subscribed by the like order of the said board of directors and in the presence of him, the said Thomas B. Atkins.

In witness whereof I have hereunto set my hand and official seal this 3d day of December, A. D. 1892.

[SEAL.]

V. BIGELOW,
Notary Pubiic, New York County.

EXHIBIT 2.

[Senate Ex. Doc. No. 5, Fifty-third Congress, second session.]

LETTER FROM THE SECRETARY OF THE INTERIOR, FORWARDING REPORT OF MARITIME CANAL COMPANY OF NICARAGUA.

DEPARTMENT OF THE INTERIOR,
Washington, December 5, 1893.

SIR: I have the honor to transmit herewith, for the information of the Senate, the original report of the Maritime Canal Company of Nicaragua, submitted to this Department this day, in compliance with the requirements of section 6 of the act of Congress approved February 20, 1889, entitled, "An act to incorporate the Maritime Canal Company of Nicaragua."

Very respectfully,

HOKE SMITH,
Secretary.

The PRESIDENT OF THE SENATE.

NEW YORK, *December —, 1893.*

SIR: Pursuant to section 6 of the act entitled "An act to incorporate The Maritime Canal Company of Nicaragua," approved February 20, 1889, which provides that said company shall make a report on the first Monday of December in each year to the Secretary of the Interior, and in accordance with instructions prescribing the form of such report and the particulars to be given therein, the said Maritime Canal Company of Nicaragua reports as follows:

First. That the regular annual meeting of the company was held at No. 44 Wall street, in the city of New York, on the 4th day of May, 1893, pursuant to the provisions of the by-laws, and that at such meeting Messrs. Joseph Bryan, James Roosevelt, Hiram Hitchcock, Thomas B. Atkins, and Horacio Guzman were duly elected directors of said company to fill the places made vacant by the class whose term of office expired on the said 4th day of May, 1893, and to serve for the period of three years as provided for in the said act of incorporation, and that at the same time Mr. Robert Sturgis was elected as director to fill a vacancy existing in the class of 1895, and Mr. Samuel Barton was elected as director to fill a vacancy in the class of 1894. Mr. Barton failed to qualify and Mr. F. F. Thompson was subsequently elected to fill the vacancy in the class of 1894. Since then Mr. A. B. Darling and Mr. Alexander T. Mason of the class of 1894 have resigned and the vacancies caused by their resignations have not yet been filled.

Second. That the board of directors of said company as now constituted is composed of the following stockholders:

Class of 1894.—Franklin Fairbanks, C. Ridgeley Goodwin, and F. F. Thompson.

Class of 1895.—Charles P. Daley, Daniel Ammen, Horace L. Hotchkiss, Henry E. Howland, and Robert Sturgis.

Class of 1896.—Joseph Bryan, James Roosevelt, Hiram Hitchcock, Thomas B. Atkins, and Horacio Guzman (Nicaraguan director).

A majority of the above-named directors are citizens and residents of the United States.

Third. That at the first meeting of the board of directors held after the said annual election the following officers were duly elected to serve for the ensuing year, to wit: President, Hiram Hitchcock; vice-president, Charles P. Daly; secretary and treasurer, Thomas B. Atkins. All of the officers so elected are citizens and residents of the United States. That at said meeting the following directors were elected members of the executive committee, as provided for in the by-laws of said company, to wit: James Roosevelt, chairman; Hiram Hitchcock, Horace L. Hotchkiss, Henry E. Howland, and Alexander T. Mason.

Fourth. That since the organization of the Maritime Canal Company of Nicaragua 10,145 shares of the capital stock of said company have been subscribed for at par, amounting in the aggregate to the sum of $1,014,500, of which amount $1,006,940 has been paid into the treasury in cash; that there has been paid into the treasury from other sources $48,871.62, making the total amount of cash received $1,055,811.62.

Fifth. That since the organization of the company it has paid for property, work, and labor done, and materials furnished in the execution of the work of constructing the canal and in administration expenses, the sum of $830,778.67 in cash and 31,990 shares of the full-paid capital stock of the company of the par value of $3,199,000, and is obligated for $6,855,000 of its first-mortgage bonds. It has also issued 180,000 shares of its capital stock of the par value of $18,000,000 in payment for concessionary rights, privileges, franchises, and other property.

Sixth. That the liabilities of the company consist of the amounts still due under the concessions granted to the company; of the $6,855,000 of bonds before mentioned, the said bonds being due to the Nicaragua Canal Construction Company for work and labor done and materials furnished in the execution of the work of constructing the Interoceanic Canal, and of cash liabilities outstanding and unpaid to an amount not exceeding $50,000.

Seventh. The assets of the company consist of its capital stock, of the concessions, rights, privileges, and franchises which it now owns, and of the plant, equipments, materials, lands, buildings, structures, railways, steamboats, telephone and telegraph lines, dredges, locomotives, cars, machinery, stores, machine shops, supplies, and other property in Central America, including the lands situated between the lake and the Pacific, purchased from the Government of Nicaragua for the route of the canal, at a cost of $50,000, in accordance with the provisions of the Nicaraguan concession.

In our annual report for 1892 we submitted a statement of the work that had been accomplished up to that date; since then the unprecedented conditions of the money market have been the cause of serious embarrassment to all enterprises that depended upon the sale of securities for means to prosecute their undertakings. The Nicaragua Canal Construction Company, under contract with this company for the construction of the canal, suffered under the general conditions in common with others, and was obliged first to limit its expenditures to what was requisite for protection and preservation of its plant, and finally to suspend all payments. This

resulted in the appointment, on August 30, 1893, by the circuit court for the United States for the southern district of New York, of a receiver for that company. The secretary and treasurer of that company was appointed such receiver.

The result of this condition of affairs is that no material advancement in construction work has been accomplished since the report made by the company to the Department in December, 1892, and, therefore, we beg to refer to that report as showing substantially the present condition of the work.

Upon the appointment of the receiver measures were inaugurated by shareholders of the construction company for the reorganization of that company upon a strong financial basis, providing for the liquidation of its indebtedness and the active prosecution of work under its contract, in the immediate future. These measures are now well under way with the every assurance of a successful issue, and the Maritime Canal Company is awaiting the result.

In witness whereof the Maritime Canal Company of Nicaragua has caused its corporate seal to be hereunto affixed and these presents to be signed by its president and secretary this 4th day of December, A. D. 1893.

THE MARITIME CANAL COMPANY OF NICARAGUA.
By HIRAM HITCHCOCK,
President.

[SEAL.] THOS. B. ATKINS,
Secretary.

The SECRETARY OF THE INTERIOR,
Washington, D. C.

STATE OF NEW YORK, *City and County of New York, ss:*

Hiram Hitchcock, being duly sworn, says that he is the president of the said The Maritime Canal Company of Nicaragua; that he has read the foregoing annual report and knows the contents thereof, and that the same is in all respects correct and true.

HIRAM HITCHCOCK.

Sworn to before me this 4th day of December, 1893.
[SEAL.] V. BIGELOW,
Notary Public, New York County.

STATE OF NEW YORK, *City and County of New York, ss:*

Thomas B. Atkins, being duly sworn, says, that he is the secretary of the said The Maritime Canal Company, of Nicaragua; that he has read the foregoing annual report and knows the contents thereof, and that the same is in all respects correct and true.

THOS. B. ATKINS.

Sworn to before me this 4th day of December, 1893.
[SEAL.] V. BIGELOW,
Notary Public, New York County.

STATE OF NEW YORK, *City and County of New York, ss:*

On the 4th day of December, in the year 1893, before me personally came Thomas B. Atkins, known to me to be the secretary of the Maritime Canal Company, of Nicaragua, and with whom I am personally acquainted, who, being by me duly sworn, did depose and say, that he resided in Roselle, N. J.; that he was the secretary of the Maritime Canal Company, of Nicaragua; that he knew the corporate seal of said company; that the seal affixed to the foregoing report was such corporate seal; that it was so affixed by the order of the board of directors of said company, and that he signed his name thereto by the like order as secretary of the said company.

And the said Thomas B. Atkins further said that he was acquainted with Hiram Hitchcock and knew him to be the president of said company; that the signature of the said Hiram Hitchcock subscribed to the said instrument was in the genuine handwriting of the said Hiram Hitchcock, and was thereto subscribed by the like order of the said board of directors and in the presence of him, the said Thomas B. Atkins.

In witness whereof I have hereunto set my hand and official seal this 4th day of December, A. D. 1893.

[SEAL.] V. BIGELOW,
Notary Public, New York County.

EXHIBIT 3.

It has been commonly said that the attractive influence of the Nicaragua Canal will be felt as far as the meridian 110° east from Greenwich. There can be very little doubt as to the general correctness of this opinion; there is room for question whether it will not be felt even beyond that limit.

Owing to favoring winds and currents which prevail in the Pacific it is no unusual thing for English sailing vessels which make the outward voyage to Hongkong or

Australia by the way of Good Hope to return around Cape Horn. Sailing vessels can only avail themselves of the shortened distance of the Suez route by towage through the entire length of the Red Sea, as well as through the canal, a total distance of 1,310 miles; whereas the entire length of the Nicaragua Canal is but 169½ miles through, which distance the cost of towage would not be a prohibitive expense, and the shortened distance, together with favoring winds and currents already availed of, in return voyages as but just mentioned, would extend the influence of the canal as regards return voyages even beyond the dividing meridian.

One hundred and ten degrees east from Greenwich includes, so far as the United States is concerned, the entire coast of China with the ports of Macao, Hongkong, Shanghai, and the island of Formosa, the Kingdom of Corea, the Empire of Japan, the Philippine Islands, Borneo, New Guinea, Australia, Tasmania, New Zealand, and, in fact, almost all of the islands of the Pacific. These points, together with the entire inhabited portion of the Pacific coast of the American Continent, are brought nearer to the eastern ports of the United States by distances varying from 3,000 to 10,000 miles. But what is of still greater importance is that all of them are brought nearly the whole width of the Atlantic Ocean nearer to New York than to European ports. New York and Liverpool are now practically equidistant from Valparaiso, Callao, Acapulco, San Francisco, and all intermediate ports, but with the opening of the canal New York will be brought 2,700 miles nearer these ports than Liverpool. At the same time Valparaiso, on the Pacific coast of South America, is brought 1,000 miles nearer to Liverpool and other European ports than by existing routes, and points north of Valparaiso are approximated by distances varying from 1,000 to 6,000 miles.

In view of these conditions it is not unreasonable to claim that all commerce existing within the limit designated will be subject to the attractive influence of a canal across the American isthmus, although there may be differences of opinion as to the degree to which that attraction will be felt.

In the years 1889 and 1890, according to the latest accessible returns, principally taken from the Statistician's Year Book and the United States Reports on Commerce and Navigation published in 1891, there was transacted between the points severally named in the following tables commerce to the amount of the value indicated:

TABLE A.—*Traffic entirely tributary to the canal.*

Between—	
Great Britain and United States Pacific ports	$31,229,063
France and United States Pacific ports	2,276,049
Germany and United States Pacific ports	1,287,129
Belgium and United States Pacific ports	1,450,168
Italy and United States Pacific ports	232,290
Cuba and United States Pacific ports	587,794
Brazil and United States Pacific ports	513,077
Great Britain and Ecuador	1,693,030
Great Britain and Peru	11,260,380
Great Britain and Chile	65,390,571
France and Chile	7,857,426
Germany and Chile	14,098,930
Belgium and Peru	7,031,400
Belgium and Chile	433,500
Belgium and China	304,900
Rest of Europe and western coast of South America	5,000,000
Europe and Pacific ports of Mexico (Acapulco, Manzanillo, San Blas, Mazatlan)	5,000,000
Great Britain and Japan	33,732,534
Germany and Japan	6,526,283
Holland and Belgium	1,550,420
Great Britain and New Zealand	53,429,965
United States (Atlantic ports) and Japan	13,796,115
United States (Atlantic ports) and Hongkong	2,303,982
United States (Atlantic ports) and China	14,164,632
United States (Atlantic ports) and New Zealand	3,419,000
United States (Atlantic ports) and Australia	11,472,003
United States (Atlantic ports) and Philippine Islands	10,101,362
United States (Atlantic ports) and Hawaiian Islands	469,500
United States (Atlantic ports) and Chile	5,789,411
United States (Atlantic ports) and Peru	1,573,530
United States (Atlantic ports) and Ecuador	1,063,721
	315,038,165

To this aggregate must be added: For existing traffic between Pacific ports of the United States and British Columbia with Atlantic ports, value not returned, esti-

mated at 250,000 tons. For canned and dried fruits, wines, canned salmon, shingles, hops, wool, etc., transported by the railroads in 1890 to the amount of over 250,000 tons.

All of the foregoing is traffic which, because of the manifest advantage to it in the saving of distance or cost, or both, must certainly make use of the canal. It has been questioned whether all of the business of the Pacific coast of South America will find it advantageous to use the canal, inasmuch as the saving of distance at Valparaiso for steamers which pass through the Strait of Magellan is but little more than 1,000 miles; this, however, is not a fair statement of facts. Nine-tenths of the business is transacted by the Pacific Steam Navigation Company, which run their vessels from Liverpool to Callao, stopping at Valparaiso and other ports en route. The distance via the Strait of Magellan from Liverpool to Callao, which is the actual length of the voyage, is about 9,960 miles. The distance, making the voyage in the opposite direction via the Nicaragua Canal, would be 7,734 miles to Valparaiso, without reference to calling at the intermediate ports, which would be about the same in either direction, or a saving of at least 2,226 miles on the voyage. For sailing vessels which can not avail themselves of the shorter route by "the Straits," but must double Cape Horn on their passage, Valparaiso, without regard to Callao, will be within the zone of canal attraction. For this reason the entire amount of this commerce is included in Table A.

TABLE B.—Traffic within the zone of the canal's attraction, but not entirely tributary to it:

Between Central America and all countries:		
Guatemala, exclusive of specie	$17,418,737	
Salvador, exclusive of specie	8,559,836	
Nicaragua, exclusive of specie	5,644,408	
Costa Rica, exclusive of specie	10,029,283	
		$41,652,264
Between Hongkong and Great Britain		16,500,000
Between China and Great Britain		55,272,430
Between China, Germany, France, etc		22,700,469
Between Australia and Great Britain:		
New South Wales	88,505,150	
Queensland	21,258,125	
South Australia	24,250,570	
Victoria	82,256,300	
West Australia	3,712,100	
		219,982,245
Between—		
Australia and Belgium		3,543,470
Australia and Germany		14,651,250
Australia and Switzerland		842,812
Australia and Sweden and Norway		2,560,825
Tasmania and Great Britain		4,051,610
Philippine Islands		19,372,075
Japan and France		17,592,895
New Caledonia, Tahiti, etc., and France		1,565,812
Between Pacific ports of the United States and—		
Hongkong	3,238,087	
China	5,033,735	
Japan	12,540,938	
Australia	3,973,754	
Philippine Islands	1,613,451	
Hawaiian Islands	16,555,725	
		42,955,690
Total		463,243,847

(For analysis and distribution of these tables *see* pp. 9, 10, and 11.)

In addition to the commerce included in these tables, there is a large business between Great Britain and the straits settlement and between Holland and Great Britain and the Dutch East Indies, in which the United States does not now participate, except to a very limited extent through the Pacific ports, or as purchaser in the markets of England and Holland. With the development of commerce between the United States and the coasts of Asia and the Pacific islands consequent upon the opening of the canal, it will naturally follow that this business, lying so near to the dividing line, although actually beyond it, shall, to some extent, contribute to the aggregate of the canal traffic, as being within advantageous reach of voyages from Atlantic ports of the United States undertaken originally perhaps to other adjacent points, but extended to embrace this business incidentally.

To determine the "tonnage equivalent" of the commerce, which enters into the foregoing tables in the form of values only, the only form in which the information is accessible in the aggregate, other statistical information furnishes valuable data.

A considerable portion of the aggregate is in low price commodities carried in large bulk; as the wheat of California and Chile and the nitrates and guano of Chile, shipped to Europe, and the coal oil of the United States shipped to Japan, China, and other points of destination. The value and bulk of these commodities is definitely reported, and thus removed from the field of estimate. For the remainder, a careful consideration of other well-established statistics will afford a satisfactory unit of valuation, or an average value per ton, by which may be determined the bulk represented by so many millions of dollars of value. This method is made necessary by the fact that the shipping returns of tonnage entered and cleared are frequently misleading. In the South American States, the same vessel is often registered in more than one port of the same country, and is thus made to count twice or more in the tonnage reports. The only traffic data of those countries, of reliability, are the values of exports and imports, which, from the channel through which they are collected—customs returns—are not apt, at all events, to be exaggerated.

The total foreign commerce of the United States for the year ending June 30, 1890, is reported as follows (merchandise only):

	Tons.	Value.
Entered, cargo only	14,111,944	$789,310,409
Cleared, cargo only	15,930,385	845,293,828
Total	30,042,329	1,634,604,337

Average value of 1 ton, $54.41.

Statistics for Great Britain, France, and Germany are as yet complete and accessible only for the year 1889. In that year the commerce of Great Britain and other countries was as follows:

	Tons.	Value.
Entered, cargo only	28,517,000	£427,595,442
Cleared, cargo only	33,048,000	313,874,970
Total	61,565,000	741,470,412

Average value of 1 ton, £12 10*d*=$58.76.

The commerce of France with foreign countries for 1889, by sea, was as follows:

	Tons.	Value.
		Francs.
Entered, cargo only	12,835,849	3,670,000,000
Cleared, cargo only	9,397,239	3,246,000,000
Total	22,233,088	6,916,000,000

Average value of 1 ton, 310 francs = $59.52.

Of Germany, the only statistics available for use are those of the port of Hamburg, which is the principal port of entry of the German Empire. They are as follows:

	Tons.	Value.
		Marks.
Entered, cargo only	4,469,698	1,245,581,000
Cleared, cargo only	3,496,303	1,206,415,000
Total	7,966,001	2,451,996,000

Average value of 1 ton, 307 marks = $73.33.

We have thus the commerce—

	Tons	Per ton
Of Great Britain	61,565,000	$58.76
Of France	22,233,088	59.52
Of Hamburg	7,966.001	73.33
Of United States	30,042,329	54.48

Making a total of 121,806,415 tons of merchandise, at $58.84 per ton, as its average value.

It is to be borne in mind that these returns are of registered tonnage, and the unit value thus established is for "registered," not actual tons.

In 1890 the wheat and flour fleet from San Francisco carried 780,000 tons of wheat and flour, at a valuation of $21,250,000, to Europe. Chile sent 860,000 tons of nitrates, at a valuation of $27,290,410, and 75,000 tons of wheat, at a valuation of $2,111,412. Peru sent about 75,000 tons of nitrate and 6,000 tons of guano, at a valuation of $350,000. Deducting this tonnage at its valuation, viz, 1,796,000 tons, at a value of $51,011,822, from the total tonnage and valuation of European commerce, viz, 91,764,089 tons, valued at $5,531,784,255, the average tonnage value of the remainder is $60.90.

In the year 1890 the United States exported coal oil, crude and refined, to the value of $47,147,163, over 3,300,000 tons in bulk. Deducting this and the tonnage and value of the wheat exports of California from the total tonnage and value of the commerce of the United States, the average value of the remainder is $62.23, or again adding together the value and tonnage of the coal oil traffic and the value and bulk of the wheat, nitrates, etc., as previously given, and deducting the totals this time from the total tonnage and valuation of the commerce of the four great maritime nations, $7,166,388,592 and tons 121,806,415, the average value of the remainder is $60.54 per ton.

From the foregoing, it appears just to assume $62 per ton as a unit of value certainly not too low wherewith to transmute the values of ordinary commerce, the bulk of which is unknown, over and above that which is known, into correspondent tonnage quantities.

Of the exportation of coal oil from the United States, 714,150 tons of illuminating oil, at a valuation of $13,974,134 was shipped to foreign ports on the Pacific in addition to large quantities shipped to San Francisco, San Diego, Portland, and other home ports. Seven million four hundred and seventy-two thousand nine hundred and sixty gallons, or about 37,000 tons were shipped to San Francisco alone.

Of the large aggregate shipped to foreign ports, the principal portion was transported by sailing vessels around one or the other of the capes, as such craft could not avail themselves of the shorter route by Suez, for the reasons before given; but as sailing vessels will be able to make use of the Nicaragua Canal, this entire business with its increase, will naturally take that route. Three hundred and eighty-two thousand six hundred and ten tons of it at a valuation of $7,745,740 was carried between ports included in Table A; 95,000 tons at a valuation of $1,837,481 between ports in Table B, and 236,540 tons, valued at $4,390,913 was distributed between British and French East Indies and Oceanica.

The aggregate of the commerce included in Table A amounts to $315,038,165. Of this total $21,250,000 represents shipments of wheat from San Francisco to Europe, 780,000 tons; $27,290,410 shipments of nitrates from Chile, 860,000 tons; $2,111,412 shipments of wheat from Chile, 75,000 tons; $350,000 shipments of nitrates and guano from Peru, 81,000; 7,745,000 shipments of coal oil from United States to ports in Table A, $382,610 tons; $256,291,343, the remainder of Table A, represents general traffic between ports indicated. Taken at the average value of $62 per ton it is equivalent to 4,133,730 tons.

For existing traffic around Cape Horn and via Isthmus of Panama between ports of the United States and with British Columbia, estimated at 250,000 tons.

For transcontinental railroad traffic in 1890 California exported from the port of San Francisco 148,446,150 pounds of canned and dried fruits, including raisins; 1,623,867 cases of canned salmon; 4,500,000 gallons of wines and brandy; 5,734,120 pounds of hops, and 22,662,000 pounds of wool, fully 90 per cent of which was transported by sail across the continent. Portland, Seattle, Tacoma, and other cities were also large exporters of like commodities; quantities of shingles were shipped from Puget Sound and all the places named were large importers of provisions by railroad. At a moderate estimate this business amounted to 250,000 tons; total, 6,812,340 tons.

The commerce included in Table B, amounting in the aggregate to $463,243,847, while within the zone of the canal's influence, will be attracted by it only in part.

The value of coal oil shipped to Central America and the East Indies, Dutch, French, and British, etc., amounts to $6,228,394, equivalent to (may be regarded as entirely tributary) 331,540 tons.

(The proportion taken by Central America is small, and therefore need not be separated in the general estimate.)

The total commerce of the four States of Central America which have their principal ports on the Pacific amounts to $41,652,264. As coffee constitutes the principal commodity of *export*, it is conceded that the average tonnage value is increased. One hundred dollars is therefore assumed as the unit of value in this case, at which rate the valuation is equivalent to 416,652 tons. A small portion of this business is transacted by the gulf ports; for this reason 60 per cent only is estimated as tributary to the canal, say, 250,000 tons.

The commerce of Hongkong, Shanghai, Japan, Australia, Tasmania, the Philippines, and other islands of the Pacific with Europe amounts to $378,635,893. As high-priced commodities also enter largely into this trade, we assume the same unit of value per ton as for Central America, say, $100; the equivalent tonnage is 3,786,359 tons. A very large proportion of this trade is now carried in sailing vessels which make their outward voyage by way of Cape of Good Hope and because of the favoring winds and currents return home by the longer route around Cape Horn.

Conceding that one-half of this total traffic (the outward bound) will not be affected, it is fair to consider 40 per cent of the remainder, or 20 per cent of the whole, as tributary, say, 757,272 tons.

The business between Pacific ports of the United States and Hongkong, China, Japan, Australia, etc., is also in high-priced commodities, and amounts to $42,955,690, which, taken at $100 per ton, is equivalent to 429,557 tons. It is largely local trade of the Pacific slope, but some of it is transshipped by rail to Eastern ports; the proportion tributary is estimated at one-eighth, say, 50,000 tons.

The shipments *from* the Straits Settlements and the Dutch East Indies to Great Britain and from the Dutch East Indies to Holland amount, in the aggregate, to a valuation of $95,472,688, or, at an average per ton of $100, to an equivalent of 954,727 tons. It is not included in Table B, being more remote and likely to yield but a small proportion, say, 10 per cent only, 95,473 tons. The aggregate of these estimates amounts to 8,296,625 tons.

This total may be regarded as the tonnage now existing, which if transit by the canal were possible to-day, would naturally seek that route and pay its tolls in preference to following routes which are at present in use.

Statistics show the normal growth of commerce to be at the ratio of about 1 per cent per annum. Assuming that the canal will be completed and ready for use by the year 1897, and that the statistics which we have used are for the year 1890, we may add 7 per cent for natural growth, say 580,760 tons, making in round numbers 8,900,000 tons as the aggregate of the existing freight for which the canal at its opening will afford the most convenient route for transportation; but this is only allowing for a normal growth of commerce, but for manifest reasons growth in greater proportion than usual is to be expected whenever the near prospect of the canal's completion shall give such assurance of its availability as to induce immigration and warrant merchants in venturing upon new enterprises. Moreover, with the opening of the canal not only will a new route be provided, but new fields will be opened to commerce by the more advantageous provision for transport of the commodities of commerce, as was argued in the pamphlet on prospective traffic, published in 1890. In that pamphlet it was remarked:

"The products of Alaska, as well as of Washington and Oregon, mostly low-priced commodities furnishing a large bulk of tonnage, will be carried at less cost to Eastern markets, the markets of the Western coast of South America will be opened to the low-priced coals of the Southwestern States, and the coasting trade now carried on with the West Indies to the extent of over 500,000 tons per annum will be multiplied beyond calculation. If a traffic of 500,000 tons has been developed between the United States and the Islands of the Carribean Sea, what may be expected when the markets of the Pacific coast of Columbia, Mexico, and Central America, of the States of Ecuador, Peru, Bolivia, Chile, and of southern California are opened to the easy access of coasting vessels?

"In the existing lake and coastwise trade of the United States steel barges carrying from 1,500 to 3,000 tons freight, transported by powerful tugs, are taken at low cost to market points, and there left to discharge and reload for a return voyage, while their motive power returns without delay with freights, in similar barges, made ready for departure before its arrival. Thus movement of freight is accelerated, invested capital is made to yield its largest returns, shippers profit by the possibility of lowered rates and consumers by the possibility of lowered prices. Under such methods the traffic of the Sault Ste. Marie Canal has developed from 1,567,741 tons in 1881 to the enormous aggregate of 8,388,891 tons in 1891, and is still increasing. And this traffic has grown up in connection with the internal trade only of a portion of the Northwestern States with the East. Like results will follow similar

methods, which are equally available in the waters opened up by the Nicaragua Canal, and American enterprise will not be slow to avail itself of the unprecedented opportunity. What people have ever had such an opportunity put before them?"

We have already mentioned the products of the forests and fisheries of Oregon, Washington, and Alaska, and the products of British Columbia. Returning to the subject, the following facts will be of interest:

The salmon pack of British Columbia, Alaska, Washington, Oregon, and California amounted in 1889 to 1,683,800 cases, about 84,200 tons, valued at $9,064,000, exceeding in quantity the pack of 1888 by 527,000 cases; 680,000 cases of the product was from Alaska and 422,000 from British Columbia. This is a growing industry. The pack amounted in 1880 to only 679,490 cases; in ten years it has increased nearly 250 per cent; by 1897, at the same ratio of increase, it will amount to nearly 3,500,000 cases. Hop-growing as an industry was commenced in Oregon and Washington in 1865. In 1889 the product was 70,000 bales, regularly quoted and competing with other goods in the New York market. The fur-seal and whale fisheries are also growing and important industries.

The cultivation of India rubber as an industry in Central America and on the western coast of California is already attracting attention. The increasing demand for the gum and the destruction of trees in their natural state by the reckless huleros, or native gum-gatherers, makes attention to an artificial supply for future demands of manufacture imperative. Already large manufacturing corporations in this country are making plantations to meet it. The huleros are so careless that not only are they destructive of the trees, but much of the gum brought by them to market is in bad condition and commands only 26 cents per pound, whereas when properly collected it is worth as much as 80 cents for the best quality. The tree grows naturally in Central America and Mexico. The western coast of the last-named country and of southern California between the ocean and 1,800 to 2,000 feet of elevation above the level of the sea seems particularly favorable to its best development. A plantation is made with shoots gathered in the forests, and with proper care will be in condition to yield a crop in six or seven years. A tree in good condition yields 10 to 12 pounds per annum, and, if not maltreated, continues to yield year after year, apparently without limit. Its yield is worth, according to quality—which depends chiefly upon its treatment—from 50 cents to 80 cents per pound. This, too, is an industry which will pay tribute to the canal.

But in the forests of the northwestern Pacific coast there already exists material which needs only the facilities of the canal for its transportation to a favorable market to yield a tonnage which alone will probably exceed that of all other industries combined. The wonderful growth of the lumber trade of that section under present limitations of transportation is an indication of the magnitude to which it will grow with the opening of new and more extended markets by the shortening of distances to them on lines within the still waters of the Temperate and Torrid zones instead of by the routes now existing through the tempestuous seas of the storm zone.

In 1886 the shipment of lumber from Oregon amounted to 6,000,000 feet, equal to 12,500 tons; in 1887, to 48,000,000 feet, equal to 100,000 tons. In 1888 the amount cut amounted to 706,985,000 feet, and the shipments abroad to 471,325,000 feet, equal to 981,925 tons, or nearly 1,000,000 tons.

Concerning the lumber trade with Eastern markets, the Post-Intelligencer, of Seattle, Wash., published the following under the dates indicated:

"*July 11.*—The sound sawmills (Puget Sound) have lately been filling special Eastern and Southern orders for extra length stuff. Quite a large number of huge spars have been lately shipped from sound ports to the East where there is ever an active market sale for that material.

"*July 14.*—The Puget Sound cedar shingles were first entered in the Eastern markets five years ago. The demand for them has ever since steadily increased, and now shingle mills all over the sound are shipping their products East as far as Ohio (i. e. railroad routes)."

The forests of Maine no longer yield the timber needed for masts and spars of large vessels. In the forests of Oregon trees grow to 12 feet in diameter and 300 feet in height. The average length of a cargo of sticks taken to Boston from Puget Sound by the bark *Crapo*, in 1890, was 126 feet, and their average diameter 39 inches. Sixty of these sticks were bought by a shipbuilder of Bath, Me., and were made into a raft and towed around to his yard. This fact shows how depleted the Maine forests are of spar timber. Cuba has attempted the importation of lumber for building purposes around Cape Horn, but found the experiment too costly to be continued. In our Southern States their own hard pine, though less desirable, is taking the place of soft pine because of advancing prices. All these demands will be met and supplied from the Oregon and Washington lumber fields with the opening of the canal. What this demand and supply will actually amount to is mere conjecture, but considering the coastwise trade as a whole, including the mahogany, rosewood,

ironwood, and teak of Southern Pacific coasts, the growing trade of Central America in coffee, cocoa, india rubber, mahogany, and other hard woods, the furs of Alaska, and the seal fisheries, whale oil, wheat, canned salmon, and other products of British Columbia, Washington, and Oregon, spar timber, and other lumber from the forests, and our outbound trade in coal, textile fabrics, agricultural implements, machinery, iron goods, etc., an addition of 1,000,000 tons per annum will be conceded to be none too great an allowance.

The aggregate of the traffic, apparent at present, from which the canal may be expected to derive its business and its revenue, amounts, then, to 8,900,000 tons, to which may be added at least 1,000,000 tons for the traffic mentioned on foregoing pages, not to speak of those unforeseen and unexpected developments, of which the commerce of all new countries has always been prolific, whenever increased facilities have afforded more favorable opportunity for an exploitation of the natural resources of the region. In this respect the opportunity of the Nicaragua Canal is unique. The countries chiefly brought into nearer contact by the Suez Canal are old and densely populated. Europe with its population of 101 to the square mile, and Asia, with a population of 57 to the mile, or, to speak more precisely, England, France, and Belgium as parts of Europe, and India and China as parts of Asia, have very few new or untried resources yet remaining open for development. On the other hand, by the Nicaragua Canal, North America with a population of 14 to the mile, chiefly east of the Rocky Mountains; South America with a population of 5 to the mile, and Australia with a population of only 1.4 to the mile, all of them the abodes of vigorous, rapidly increasing, and enterprising populations, with as yet many only partially developed resources, the magnitude and value of which are already shown by such essays as have been possible under existing circumstances to be almost incalculable, are brought nearer to each other and into closer connection with Europe, by a channel of communication through a country unsurpassed in its natural beauties and resources, possessing a climate exceptionally healthy, which from its natural characteristics must, when facilities for travel are afforded, become a pleasure resort for travelers from all parts of the world.

It would seem that if the conditions for an unprecedented growth of population, commerce, and material prosperity ever existed anywhere, they exist here to a degree never before exceeded. The great success of the canal at Suez, not only in respect of its returns to those who ventured their capital in its construction, but more especially in the realization of all the advantages to commerce which were predicted of it by its projectors, is an assurance that the Nicaragua Canal, when completed, will find commerce ready to avail itself, at once, of its advantages, instead of waiting until the more venturesome spirits shall have tried them and proved their merits. Because of the great success at Suez, the advantages of canal transit have ceased to be subject of experiment, and have become demonstrated facts. The business of the Nicaragua Canal, therefore, will not be of small beginnings and slow growth, but will at once assume a magnitude commensurate with the opportunity; and it is not unreasonable to expect that of the 9,900,000 tons estimated as within the zone of attraction, at least two-thirds, or, say, 6,500,000 tons, will seek the new route for transit as early as within the second year of its operation.

If the canal tolls be fixed at $2.50 per ton this amount of traffic will yield a gross revenue of $16,250,000.

The cost of maintenance and operation of the canal after its completion can not be large. The route is made up principally of broad stretches of water, with natural banks, or of cuttings through solid rock, which, once made, will be permanent; and there are no sands drifting from widespread desert plains, as at Suez, to fill its channel continually and make necessary large and unceasing expense for heavy dredging. The cost of maintenance must, from the nature of things, therefore, be moderate. The operation of the lock of the Sault Ste. Marie Canal, which passed nearly 7,500,000 tons in the season of 1890–'91, together with all other expenses of that canal for that year, amounted to $45,417. Allowing $50,000 for each of the 6 locks of the Nicaragua Canal for operating alone, and making a similarly liberal allowance for maintenance, administration, and all other expenses, the total annual cost can not exceed $1,500,000, which, on an annual traffic of 6,500,000 tons, at the rate of toll suggested, shows a net revenue of $14,750,000, or 5 per cent on a total capitalization of $295,000,000 to be realized immediately upon the attainment by the enterprise of such a condition of advancement as will afford opportunity for demonstration of its capabilities.

What the growth of its traffic and revenue may be from this point is, of course, a matter of conjecture, but in view of all the contingent conditions it can not fail to be large and rapid, and it is not unreasonable to believe that although the canal has been projected with a view to the accommodation of a large traffic, its capacity, before many years shall have passed, will be taxed to the utmost.

52D CONGRESS, 2d Session. } SENATE. { REPORT No. 1142.

IN THE SENATE OF THE UNITED STATES

DECEMBER 22, 1892.—Ordered to be printed.

Mr. SHERMAN, from the Committee on Foreign Relations, submitted the following

REPORT:

[To accompany S. 1218.]

On further consideration of the subject presented in their report of the Fifty-first Congress, the Committee on Foreign Relations recommend some changes in the details of the measure thus submitted to the Senate as a bill of the committee, but they adhere to and recommend the purposes and the general plan of legislation thus presented, and adopt the report then made in support and explanation of the Senate bill, No. 1218, now reported to the Senate with amendments.

With the progress of events relating to a ship canal through the Isthmus of Darien and, especially, with reference to the recent demonstration that the Panama Canal can no longer be looked to as furnishing the waterway that our communication between the Pacific States and the Atlantic States require as a commercial necessity and national protection, it is manifest that the people of the United States, without division on political lines, or on lines of latitude or longitude, are earnestly demanding that Government aid be extended to the Nicaragua Canal.

It is entirely clear that a work of such magnitude can not be constructed on the credit of any chartered company, at a reasonable cost, nor can this canal be so constructed as to guarantee its impartial use to all maritime nations without the assistance and support of the United States.

The concessions made by Nicaragua and Costa Rica under which this work is progressing distinctly provided that the canal should be constructed by a company of execution, to be called "The Maritime Canal Company of Nicaragua," with its principal office in New York. The concessionaires were all citizens of the United States, and, in conformity with their concession, they asked the United States for a charter, by act of Congress, to enable them to execute the work described in the concessions of Nicaragua and Costa Rica, which was granted by act of Congress, approved February 20, 1889.

This act of Congress, construed in connection with our treaties with Nicaragua and Great Britain, made this canal, in a practical and important sense, a facility of government in connection with our coastwise trade and our foreign commerce, and as to our postal establishment and the transmission of our troops and munitions of war and warships from ocean to ocean.

So that it was a clear and specific purpose of the act of Congress that the political control over the Maritime Canal Company of Nicar-

agua should be retained by the United States while that company should continue to act under that charter.

In this view, the act of Congress provides, in section 6, that—

> Said company shall make a report on the first Monday of December in each year, to the Secretary of the Interior, which shall be duly verified on oath by the president and secretary thereof, giving such detailed statement of its affairs, and of its assets and liabilities, as may be required by the Secretary of the Interior, and any willfully false statement so made shall be deemed perjury and punishable as such. And it shall be the duty of the Secretary of the Interior to require such annual statement and to prescribe the form thereof and the particulars to be given thereby.

No corporation, other than one created to promote public purposes, could be reasonably subjected to such requirements, and it is not possible, under a sound construction of the concessions granted by Costa Rica and Nicaragua, either as to their language or proposals, that those Republics could retain to themselves, respectively, in the body of their concessions, as Governments, the right to appoint directors in a mere private corporation.

Three Governments concurring in creating a corporation, in which each may have a special governmental interest or concern; in which each is or may be a stockholder, and entitled to appoint directors, and over whose conduct and destiny each Government exercises, to certain extent, a sovereign control, must by their joint or concurrent act create a public corporation.

The United States can, in the exercise of its sovereign power, expressly reserved in the charter, alter, amend, or repeal the act of Congress creating a corporation, in which Nicaragua has $6,000,000 of stock and a director, and Costa Rica has $1,500,000 of stock and a director, and can limit the entire stock of the company to $100,000,000. Neither of these Governments can, with due regard to its sovereignty, afford to consider this as a mere private corporation.

It is quite clear that these Governments admit the right of the United States, under the powers conferred in their concessions, to exercise this governmental control over the conduct and destiny of the Maritime Canal Company of Nicaragua, by participating in the organization of the company and in its control through directors appointed by them, and also by their respective decrees that the work done upon the canal, under the charter granted by the United States, is a full compliance with the conditions precedent upon which those concessions were to become permanent grants.

The committee have, therefore, considered the bill (S. 1218) as a measure relating to a public corporation, and that its provisions are in strict conformity with the concessions of Nicaragua and Costa Rica, owned by the Maritime Canal Company, and also with our treaties with all countries having an interest in the subject of this interoceanic canal.

The controlling facts relating to this work, in its engineering aspects, are stated in the former report of this committee, which is adopted as part of this report. They are not materially altered except in the direction of giving greater certainty that all the apparent doubts and difficulties then existing as to engineering problems are being removed, or minimized by the actual results of work done on the ground.

The work done on the canal in the clearing of timber from the line, in the building and ballasting the railroad through the marsh lands adjacent to the eastern coast, now 11½ miles long, and in deepening the entrance to the harbor at Greytown, has all fallen within the estimates submitted by Mr. Menocal as to its cost, and it does not, as yet, appear that his estimate of the total cost of the canal, viz: $65,000,000, is likely to be exceeded, when it is completed for traffic, if the money

to build it is provided with certainty, so as not to increase the cost by unnecessary delays and expenditures.

The most recent report of the president and secretary of the Maritime Canal Company, made to the Secretary of the Interior, and the other documents and statements submitted on the hearings before this committee, authorized by the Senate, in the opinion of the committee justify the conclusions herein stated.

Under this bill, as amended by the committee, the liability of the United States upon the indorsement of the bonds of the Maritime Company is the same in amount as that contained in the former bill, viz, not to exceed $100,000,000, at the rate of 3 per cent interest per annum. The time of the maturity of the bonds is changed in the present bill. They are to bear date on the 1st day of January, 1893, and to bear interest from the date of actual issue and mature in 1953, and are redeemable at the pleasure of the Government after 1913.

The stock of the Maritime Company is limited to $100,000,000. Of this stock $6,000,000 is reserved to Nicaragua, as paid-up stock in its concession, $1,500,000 is reserved to Costa Rica in its concession, and $12,000,000 remains in the ownership of the purchasers thereof from the Maritime Canal Company of Nicaragua, it having been issued by that company in payment for the concessions and for all work done and expenditures made and engagements entered into prior to the date of the sale and transfer of the concessions to said company. All the remainder of the stock thus limited, viz, $80,500,000, is vested in the United States in absolute ownership and without liability to further payment or assessment, in consideration of its indorsement of such an amount of the bonds of the Maritime Company, not to exceed $100,000,000, as shall be necessary to complete the canal.

Under this arrangement, and according to the estimates of skilled and impartial engineers, the United States will own at least one dollar of stock in the Canal Company for each dollar of bonds that shall been expended in its construction, with a sinking fund, for which the bill provides, of $1,000,000 per annum, invested in the bonds of the company or in other good securities at 3 per cent interest. The entire authorized sum of the bonds, if they were all issued, would be paid off by the sinking fund in a period a little less than fifty years.

It is confidently assumed by the committee that during a period of twenty years after the canal is completed the tonnage of vessels passing through it annually will average 9,000,000 tons, in addition to a very heavy passenger traffic.

The history of the Suez Canal and the St. Marys Canal, on the lakes, give an almost certain basis for this assumption as to the tonnage that will pass through the canal, which falls far below the estimates of a great number of well-informed commercial men.

This calculation of the committee would yield, in revenues annually, not less than $9,000,000, at the rate of $1 per ton, which is less than one-half the toll that is paid on vessels passing through the Suez Canal.

This revenue of $9,000,000 would pay the interest on $100,000,000 bonds ($3,000,000), the cost of the maintenance of the canal, say $3,000,000, and would leave $3,000,000 for the stockholders. But it is not probable that the cost of maintenance would exceed $1,800,000 per annum.

The revenue of the United States from the canal, on this basis, would more than pay the entire cost of the canal in twenty years if it is all

placed in a sinking fund and invested annually in the bonds of the company.

Before any bonds of the Maritime Company can be issued under this act, all debts of that company must be canceled, and all contracts for work to be done and all agreements inconsistent with the act are to be rescinded.

To provide an active fund for continuing work now in progress, and increasing it, and for necessary purchases of supplies and material, $1,000,000 of the indorsed bonds are to be issued to the Maritime Company, to be applied only to such purposes and to be credited on the first audit and settlement of the monthly installments for work done on the canal. The Maritime Company, having surrendered its interest in its entire stock, and being prohibited from issuing bonds or the creation of a debt to raise money, and having put all its property under mortgage to the United States, could not obtain the money necessary to proceed with the work on the canal otherwise than by a provision of this sort.

Some additional guards have been provided in this bill to regulate the expenditures of the company in constructing the canal and to subject them to the constant scrutiny and approval of a board of engineers appointed by the United States. But the United States is to have ten directors, in a board of fifteen, in this company, to be appointed by the President and confirmed by the Senate, and of the other five directors the President, voting the stock of the United States, by his proxy, may choose two.

As the persons selected for this important trust must be men of experience, ability, and high character, the security for the proper use of the subvention of the Government, the honest administration of the affairs of the Canal Company, and the proper adjustment of tolls for the mutual interests of the people and the company, is quite as great as the country would have if the ownership of the canal and the sovereign right to control it and to provide for its direction was in the United States.

It is believed that the peculiar constitution of the board of directors gives safeguards and checks against unfaithful or unwise administration of the canal company and its property that are better than we would have if the United States should own, construct, and operate the canal without the intervention of Nicaragua and Costa Rica and the other holders of the stock of the company.

The legislation proposed in this bill does not, in the least degree, trench upon the sovereignty, or the property rights, or the political autonomy of Nicaragua or Costa Rica. Neither does it violate any provision of the Clayton-Bulwer treaty with Great Britain or any rights we may have acquired in Costa Rica, or any treaty of the United States with Nicaragua.

The concessions of Nicaragua and Costa Rica, made to Mr. Menocal and his associates, and all now owned by the Maritime Canal Company of Nicaragua, admit the United States, or any other government, to the full opportunity of acquiring and exercising every right and power of control over this canal that is proposed to be exercised in this amended bill. When we have acquired this power of control over the canal the United States will have no more sovereign power in Nicaragua than now exists under the treaty of 1867 with that Government.

It seems to be justly conceded by the judgment of enlightened men and nations throughout the world that the United States have the natural right to a dominant influence in the control and protection of the canal

through Nicaragua, and that the duty rests upon our Government to see that unjust discriminations shall not be made against any nation in the peaceful use of this great waterway. We are the only power on this hemisphere that can secure such guaranties to the lawful commerce of all nations, and the concessions to which this bill relates, and our treaty with Nicaragua of 1867 provides for our active endeavors to make good that pledge to the world.

This bill neither enlarges nor diminishes our rights or powers, as they exist, nor those of Nicaragua or Costa Rica beyond the express stipulations of their respective concessions, but is in harmony with them and with our treaty relations with all governments.

The mortgage and statutory lien provided in the bill for the security of the United States, while of little importance because of the control over the operations of the maritime company secured by the ownership of more than 80 per cent of the stock by the United States, is carefully adjusted in the bill in order to make our security, if that is possible, more complete and to remove all grounds for misunderstandings in the future.

The possible difficulties that might attend a strict foreclosure of the mortgage, upon property in a sister Republic, are of little weight when we consider that the concessions on which this bill is based provide for such a mortgage and carry with this provision the equitable right to such a foreclosure.

It would be in the nature of an impeachment of the honor and integrity of Nicaragua and Costa Rica to anticipate, in our legislation, that either of those States would interpose a national obstacle to the full realization of all that can be justly implied when they permit the concessionaires and their successors to give a mortgage on all the property and all the privileges granted to them, to raise the money to construct a canal of such vast benefit to those States and their people.

The committee refers to this topic only because it has been mooted by some inquiring persons, as a possible objection to the bill, and not because any such question has been intimated by either of those governments. In all dealings between independent nations in matters of this kind something is necessarily left to find its proper adjustment at the time when its solution becomes a practical question for discussion and settlement.

In this instance, the most painstaking care seems to have been taken by Nicaragua and Costa Rica in their respective concessions, and subsequent legislation, to remove every difficulty that could be anticipated that could stand in the way of this great work, and, in this, as in all their dealings with this subject, they have approved themselves to the judgment of mankind as being just, sincere, and liberal.

51ST CONGRESS, 2d Session. } SENATE. { REPORT No. 1944.

IN THE SENATE OF THE UNITED STATES.

JANUARY 10, 1891.—Ordered to be printed.

Mr. SHERMAN, from the Committee on Foreign Relations, submitted the following

REPORT:

[To accompany S. 4827.]

To the SENATE:

The Committee on Foreign Relations respectfully report that on the 11th day of April, 1890, the Senate, in executive session, adopted a resolution in the following terms:

Resolved, That the Committee on Foreign Relations be, and it hereby is, directed to inquire into what steps have been taken under the act of Congress entitled "An act to incorporate the Maritime Canal Company of Nicaragua," approved 20th February, 1889, and what are the present conditions and prospects of the enterprise; and to consider and report what, in its opinion, the interests of the United States may require in respect of that interoceanic communication.

In obedience to this direction of the Senate the committee entered upon an investigation and consideration of the subject, which they have diligently and exhaustively pursued, and now submit their report thereon with an accompanying bill, the passage of which we earnestly recommend.

Columbus, in his last voyage in 1502, believed that he would find a strait in Central America which would give his vessel a passage through the continent, which he then supposed to be a vast island, to waters at the westward which should bring him into immediate communication with the shores of Asia. He therefore examined the coast of Central America from the bay of Honduras to the Spanish Main. He sought that which did not exist in physical geography. Irving, in referring to his search, says:

> He had been in pursuit of a chimera of a splendid imagination and penetrating judgment. If he was disappointed in his expectations of finding a strait through the Isthmus of Darien it was because nature herself was disappointed. For she appears to have attempted to make one, but to have attempted in vain.

Nature, however, was not much disappointed in her efforts between the two seas at Nicaragua. There is the lowest continental divide (148 feet) between the Strait of Magellan, in latitude 53°–4° south, and the perpetual and all-pervading ice that forms the northern boundary of the Eng-

lish Possessions, in latitude 70° north, between which is a space of 126 degrees of latitude, equal to nearly 9,000 miles.

Almost four centuries have passed since Columbus was baffled in his efforts to reach the tranquil sea and to open direct communication westward from Europe to Eastern Asia, while, during all this time, benignant nature has placed within the reasonable capacity of civilized man the means of making such communication practical and beneficent.

But the great desirability of communication was not lost sight of. In 1551 the Spanish historian Gomara proposed the construction of a passage through the Isthmus and urged on Philip II the attempt to accomplish it on some one of the three routes that have, in recent times, been so often considered and in some respects attempted, viz, Tehuantepec, Nicaragua, and Panama.

Later, and in comparatively recent times, surveys and reconnoissances have been carried on or attempted over almost every part of the Isthmus. Time, research, and experiment have, we think, now demonstrated that the only adequate, efficient, and practicable passage is that by way of Lake Nicaragua. And it is due to the Republic of Nicaragua to say that in the year 1825 the minister of foreign affairs of that country addressed Mr. Clay, then our Secretary of State, on the subject, and appealed to the United States to assist in executing the work of a canal there. He stated that his new-born republic was in the first period of its existence, and said that—

> Nothing would be more grateful to it than a coöperation by this generous nation, whose noble conduct has been a model and the protection to all the Americas; it would be highly satisfactory to have a participator not only of the merit of the enterprise, but of the great advantages which that canal of communication must produce, by means of a treaty which would perpetually secure the possession of it to the two nations.

The executive administration of the United States entered with interest into the consideration of the subject, and Nicaragua was informed that the then newly appointed United States chargé d'affaires to that country would investigate the subject and communicate information upon it to the United States, and that it would then be necessary to consult Congress. It does not appear that the diplomatic officer of the United States obtained any definite information in respect of the feasibility of the enterprise. But Mr. Clay, in his letter to the Commissioners of the United States to the Congress of Panama, observed:

> A canal for navigation between the Atlantic and Pacific oceans should form a proper subject of consideration at the Congress. The vast object, if it should ever be accomplished, will be interesting in a greater or less degree to all parts of the world; but especially to this continent will accrue its greatest benefits; and to Columbia, Mexico, Central America, Peru, and the United States, more than any other of the American nations.

It is evident to the committee that it was the want of precise information, such only as careful engineering, surveys, and estimates could furnish, which left the project unattempted at that time or soon after.

But the hungry instincts of commerce, as well as a deliberate comprehension of its interests and necessities, led, from time to time, to enterprises of one kind and another, inaugurated to accomplish the passage of the Isthmus by a ship waterway.

A new and more powerful impulse and interest arose when, shortly before 1850, the northern portion of Mexico bordering upon the Pacific became a part of the Republic of the United States, immediately followed by the discovery of the enormous resources of the country, not only in the precious metals, but in all those aspects of nature best adapted to the support and development of self-sustaining, civilized, and populous communities.

The construction of such a canal as is now proposed appeared to be an immediate and somewhat urgent necessity. The British had obtained a narrow foothold through so-called negotiations with the Indian chiefs of the Mosquito coast (a geographical phrase of almost unlimited elasticity). British subjects had a "settlement" at the Belize for the purpose of getting and carrying away mahogany and other wood products under an ancient license from Spain.

The British Government had also seized the country at the mouth of the San Juan River, which was the necessary Atlantic end of the canal via Nicaragua. It may be fairly concluded that Her Majesty's Government was solicitous that the United States should not be the controlling party in interest in the construction of the then impending enterprise of a canal; and that the United States were quite as solicitous that a Government of another continent and not republican should not establish itself by conquest, colonies, or dependencies or spheres of influence in the midst of any of the Republics of Central America. Such considerations doubtless led the two Governments to conclude the Convention of 1850 known as the Clayton-Bulwer Convention.

That convention was, as stated in its opening paragraph, one in which the two Governments were to set forth and fix "their views and intentions with reference to any means of communication by ship canal," etc, across the isthmus.

The convention then proceeds to declare that neither of the Governments will ever obtain for itself any exclusive control over the canal "or colonize or assume or exercise any domain over Nicaragua, Costa Rica, the Mosquito Coast, *or any part of Central America*," etc.

It provided for the exertion of the influence of the two Governments in facilitating the construction of the work by every means in their power. It provided that after completion they will defend its neutrality, with the privilege of withdrawing such guaranty on notice. It provided for inviting other Governments to come into the same arrangement. It provided that each party should enter into treaty stipulations with such of the Central American States as they might deem advisable for carrying out the great design of the convention.

It declared that no time should be unnecessarily lost in commencing and constructing the canal and, therefore, that the two Governments would give their support and encouragement to such persons, etc., as might first offer to commence the same with the necessary capital, etc., and that, if any persons then already had obtained the right to build it from the Central American Government and should fail, each of the two Governments should be free to afford their protection, etc., to any other company that should be prepared to proceed with work.

All these declarations of views and stipulations concerning them were made forty years ago.

During all this time no practical and effective steps in the construction of the canal have been taken until the passage of the act of Congress of February 20, 1889, incorporating the Maritime Canal Company of Nicaragua.

We think it can be justly affirmed that the convention of 1850 has become obsolete, for the convention was based upon the idea of an immediate prosecution of the enterprise of creating this great international water highway, and that neither Government would be found, so far as it regarded the particular question, apart from other considerations, to consider its stipulations as longer binding.

Not only this consideration is to be taken into view, for the course of events in the enterprise and operations of nations has changed entirely the grand commercial situation of the world. The Suez Canal has been constructed and the Government of Great Britain has become, in substance and effect, its dominant and controlling proprietor, thus securing to that Government, in a very large degree, the control of the east and west commerce of the world between the southern and eastern shores of Asia and the whole of Europe and, to a conisderable degree, the eastern shores of the United States and the other American Republics.

We think it may be safely affirmed that had the Government of Great Britain, in 1850, been in possession of the Suez Canal, the United States would never have consented that any canal across the American isthmus should be under the joint control of Great Britain and the United States or under any other European control. In this respect, therefore, the immediate declarations and engagements of 1850 between the two Governments, in regard to an isthmian canal, have become entirely inapplicable, and justly entitle the United States to give its separate aid and encouragement to the construction of such a canal. But this is not all.

One of the provisions of the convention of 1850 most important to the United States and to the preservation of the republican governments on this continent was that which declared that neither party to the convention should "occupy or fortify or colonize or assume to exercise any dominion over Nicaragua, Costa Rica, *the Mosquito coast, or any part of Central America.*"

At that time the "settlement" of British subjects, as it was called, at the Belize, on the coast of Central America, was of the smallest dimensions, and had no substance or form of a territorial dominion. British woodcutters were there under an ancient Spanish license of timber cutting, and nothing more. These settlers in a country not belonging to the British Crown had, off and on, attempted to form a kind of local government for preserving order among themselves, and, after going through various phases, had reached the point, in 1850, of some local magistrates and an imperial superintendent, merely and clearly for the purpose of preserving internal order among the English adventurers engaged in the lumber trade in that foreign country.

This was substantially the condition of things when the convention of 1850 was entered into.

The next step taken, after the convention of 1850, was in 1853, when a legislative assembly was constituted to manage the affairs of the settlement. This was followed by a convention between Great Britain and Guatemala, in 1859, for the establishment of the boundaries between what the treaty chose to call "Her Britannic Majesty's settlement and *possessions* in the Bay of Honduras" and the territories of Guatemala. The country, or the largest part of it, belonged to Guatemala as the successor to all the sovereign territorial rights of Spain in that region; but by this treaty that which was before a licensed industrial establishment became instantly a possession of the British Crown. The settlement government continued until 1862 when the settlement was declared a colony of the British Crown and a regular colonial establishment was set on foot; and so from that time to this, the form and substance of a regular colonial government as a part of Her Majesty's dominions has continued. It is understood that its geographical dominion has been vastly enlarged from the licensed wood-cutting limitations and boundaries that existed in 1850. All this has taken place systematically and persistently notwithstanding the declaration of Her Majesty's Government that it should not "colonize or assume or exercise any dominion over * * * the Mosquito coast or any port of Central America".

If these proceedings of her Majesty's Government, in respect of one of the most important subjects of the convention and in absolute opposition to it, do not discharge the United States from all and every of their declarations and engagements stated in that convention, it is impossible to conceive what could.

In view of all these considerations the committee is of opinion that the United States is at present under no obligation, measured either by the terms of the convention, the principles of public law, or good morals, to refrain from promoting, in any way that it may deem best for its just interests, the construction of this canal, without regard to anything contained in the convention of 1850.

These observations are submitted as a part of the historical and

diplomatic consideration of the subject, the omission of which might lead to the implication that the committee are opinion that the convention of 1850 is still in force and of binding obligation on the United States, but we think there is nothing in the provisions of the bill now reported which is inconsistent with any of the engagements of the United States entered into in 1850, as stated in that convention.

In view of some of the events following the convention of 1850 the United States in 1867 entered into a treaty with the Republic of Nicaragua by which that Republic granted to the United States, for its citizens, the right of transit between the two oceans, on any route of communication, natural or artificial, whether of land or water, that might be constructed, to be used upon equal terms by the citizens of the two Republics.

This treaty of 1867 is still in force and would, we think, of itself justify the United States in undertaking to aid the construction of the Nicaragua Canal. In 1884 the President of the United States negotiated a treaty with the Republic of Nicaragua providing for the construction of the canal by the United States and under arrangements that preserved the sovereignty of Nicaragua and secured to all the Central American Republics, as well as the United States, the benefits of the enterprise.

That treaty was submitted to the Senate in December, 1884, but before its final disposition it was withdrawn by the President on the 13th of March, 1885, for further consideration, and has not been again submitted to the Senate for reasons stated by him and mentioned further on. Afterwards, in 1887, the Republic of Nicaragua, supposing, apparently, that the treaty which had been negotiated would not go into effect, made a concession of the right to build the canal to a private association of citizens of the United States (known as the Nicaragua Canal Association), through Mr. A. G. Menocal, who had been one of the engineers employed by the United States in making surveys there.

That concession explicitly provided, first, for the exclusive privilege to build and operate the canal for ninety-nine years. It provided that the concession might be taken by a company of execution to be organized by the association, which is the company chartered by Congress February 20, 1889. It provided that the people of all nations should be invited to contribute capital on a certain notice, which notice, the committee understands, has long since been given. It provided for a reservation of 5 per cent. of the subscriptions to the Central American Republics. It provided that shares not so taken should be subject to the free disposition of the company. It provided the respective terms and time within which work should be commenced and, in general, the rapidity with which it should be carried on. It provided that the Government of Nicaragua should receive 6 per cent. of the total amount of the issue of the stock, etc., as compensation for the grant.

It made other provisions in respect of detail, protection, management,

etc., analogous to those usual in statutes granting corporate privileges for public works. Later the Republic of Costa Rica assented to the arrangement so far as her interests were concerned.

Pursuant to the provisions of this concession Mr. Menocal and his associates, all citizens of the United States, became incorporated as the Maritime Canal Company of Nicaragua, under the act of Congress of February 20, 1889.

This last-named company has since proceeded with the work in conformity with the terms of the concession and with the act of incorporation. The extent, nature and physical characteristics of the work are stated in another part of this report. In immediate connection, however, with the preceding meager historical statement, it may be most convenient to state the general geographical, commercial, and political situation of the subject viewed in its broader aspects.

It is self-evident from climatic considerations that the great bulk of the commerce and intercourse of the world must move on eastward and westward lines. A glance at any modern map of the world on Mercator's projection will show the geographical relations of seas and continents and the arrangement of the present commercial lines of ocean and land transit; it will show how perfectly correlative, in these respects, the Central American isthmus is to the Isthmus of Suez.

It will be seen also that, while the Suez Canal is immediately most important to the commerce of the whole of Europe with southern and western Asia, the Nicaragua Canal is immediately and most largely important to the great body of the Republics of North, Central, and South America.

The Nicaragua canal will bring into the utmost possible near communication the eastern and western shores of North America, and, in like manner, it will bring into the utmost possible short communication the eastern and western shores of South America, and it will bring the western shores of South America into direct communication with the eastern shores of North America, and the eastern shores of South America into direct communication with the Western shores of North America, thus making the short passage of the Isthmus the grand key and common gateway of friendly communication between the republics that now occupy substantially the whole of the habitable parts of both the continents of North and South America.

Not only will this be accomplished, but the great lines of the world's trade by sea will be, by this canal, very much shortened, and the perils of navigation and the asperities of climate will both be immensely diminished. We submit herewith for consideration in this connection a table (marked Appendix 1) showing some of the savings of distance in sea navigation by the use of this canal.

We think it quite unnecessary to speak at large of the great political considerations attending the construction of this work under the patronage of the governments and citizens of the United States and the

republics whose territorial and sovereign interests are directly concerned in it.

These considerations are not those that look to hostile or adverse dealing with the other nations of the globe, but such as look to giving the benefits of the opening of this great "secret of the strait" to the whole family of civilized mankind, always under such just and considerate administration as shall promote to the utmost degree the harmonious and intimate intercourse of all the republican governments which now, as we have said, occupy, almost entirely, the two great western continents, and such as shall enable them to protect and improve themselves commercially and otherwise in their republican and commercial development and prosperity.

THE PRESENT CONDITION OF THE WORK ON THE NICARAGUAN CANAL GIVES A STRONG ASSURANCE OF ITS EARLY COMPLETION.

The work has advanced rapidly and with such uninterrupted success that some of the most important parts of it have already been accomplished. This is especially true as to the engineering and the clearing of the line of the canal and the building of a railroad preparatory to the dredging of the channel.

Nature has placed within the convenient reach of science and labor the requisite conditions for the location of this great ship canal, and the material for its construction at a very low cost as compared with other similar enterprises. When it is constructed on the plan and on the ocation selected it will for ages furnish ample water way, convenience, and security to the fleets of all nations that may pass through this canal from ocean to ocean.

The enthusiasm naturally excited by the magnitude and importance of such a work is appreciated by the committee, and has increased their caution in presenting only such facts in their report as are well authenticated, and such conclusions as they seem to fully sustain. The reports and papers herewith submitted, as appendices to this report, and to support the recommendations of the committee, come from sources that are worthy of full credit. They are, first, a paper read by A. G. Menocal, chief engineer of the Maritime Canal, in July, 1890, at the Fourth International Congress on Inland Navigation, Manchester, which is marked Appendix A.

Second. A special report by Charles T. Harvey, civil engineer, on the maritime canal of Nicaragua, and data relating to the ship-canal facilities and traffic of the Lake Superior basin, marked Appendix B.

Third. The report of Frank P. Davis, division engineer of the company, dated at San Juan Del Norte, Nicaragua, October 19, 1890, covering also the report of Chief Surgeon J. Edward Stubbert, dated November 1, 1890, marked Appendix C.

Fourth. A paper issued by the Maritime Company in 1890, entitled "The Maritime Ship Canal of Nicaragua", marked Appendix D.

Fifth. An article from the Engineering News, of dates the 14th and 11th September, 1889, marked Appendix E.

Sixth. An article published in the California Banker's Magazine, in October, 1890, by William L. Merry, marked Appendix F.

Seventh. The report of A. G. Menocal, of January 1, 1890, and a report from five civil engineers, selected by the Maritime Canal Company, to revise the report and estimates of A. G. Menocal, chief engineer, marked Appendix G and H.

After Mr. Menocal had completed the surveys required for the permanent location of the route of the canal he requested the company to select a board of engineers of the highest skill and experience to thoroughly examine his report, and to revise his estimates of the cost of the canal. This was done with due care and impartiality. His estimates were increased by $14,633,262, to cover contingencies which include every possible increase of the cost of the work from causes within the range of probable conjecture.

These calculations and results have also been critically examined by many of the leading engineers of the world, without any practical dissent from the main propositions in Mr. Menocal's reports. The attention of scientific engineers, and of various governments, has long been directed to this proposed transit for ships across the Isthmus of Darien, and it may now be stated as the final concensus of opinion, based on many surveys, that the Nicaraguan route is the most feasible and the least costly of all the routes that have been projected for a ship canal across that barrier. It can now be assumed as a fixed and reliable fact that the best location of the axis of the canal has been selected for this work.

The statements and opinions of Mr. Merry, as expressed in Appendix F, are those of an experienced navigator, who was for many years the president of the San Francisco Board of Trade. They also reflect the opinions of the people of the Pacific coast, who have most carefully studied this subject, as to the wisdom of the policy indicated in the bill herewith submitted to the Senate.

The committee respectfully invite attention to the great force and effect of the facts presented in these several papers as to the value of this ship canal, and the comparatively small expenditure required to secure to all the nations and peoples of the earth the benefits of this highway for travel and commerce, that connects all the great oceans and seas of the globe.

The canal, as it is located, after patient, careful, and skillful examination, has features of great and peculiar advantage that are not found elsewhere in the world for a work that can approximate it in its importance to mankind. It has for its crest line and reservoir the deep lake of Nicaragua, that is fed through a narrow outlet by Lake Managua to the northward, where the heavy torrents from the rainfall in the

mountains are caught and imprisoned. Lake Nicaragua is a rock-bound basin, with a single outlet, called the San Juan River.

This outlet has a deep and constant current of water, without any natural obstructions or sudden falls, and is never flooded with a rise of more than 4 or 5 feet by the heaviest rainfalls, so that it is a safe feeder for the ship canal. The difference in the volume of water discharged between the highest and lowest water in the lake is about 1,000 feet per second. The distance from the Caribbean Sea at Greytown to the Pacific Ocean at Brito is 169.448 miles, all of which will be slack-water navigation except 26.783 miles, which is the length of the prism of the canal, making 142.659 miles of free navigation. A dam at Ochoa, on the San Juan River, the "divide" between the San Francisco River and the Deseado, about 16 miles from Greytown, and a dam at Tola, within 4 miles of the Pacific coast, with a short interval of canalization, extend and establish a clean surface level of 153¼ miles over the whole distance of 169½ miles between the oceans.

For the exact measurement of these distances the committee refer to the papers appended to this report. It has impressed the committee that this route has very important advantages in the fact that such a great distance of slack water navigation is secured by the erection of two dams at places where the structures can easily be made entirely secure by the use of material found in abundance along the line of the canal. The surveys for this work were made with the greatest care. They average about 40 miles of preliminary lines to 1 mile of actual location.

At Ochoa, on the San Juan River, below the entrance of the San Carlos River, flowing northward from Costa Rica, the line of the canal diverges to the eastward, while the flow of the united rivers is to the southward.

Behind a range of low hills a valley, or basin, was found, into which the waters of the San Juan will be forced by the dam at Ochoa. In this basin about 9 miles of water at the level of Lake Nicaragua will form a vast estuary and dispense with the necessity of excavating the canal. Another important result is that the canal is beyond the influence of any flood that may occur from the united volumes of the San Juan and San Carlos rivers in the rainy season.

The skillful thoroughness of the surveys have secured a location for the canal that includes every possible advantage that the topography of the country and the easy and cheap control of the best material for its contruction affords.

The dams, banks, slopes, aprons, drains, weirs, locks, and waste-ways have been so located as to assure the permanency of the work.

The quarries of stone along and near to the line of the canal while increasing the cost of excavation, strengthen the work and are of great advantage in the construction of locks and dams and in the building of bridges, piers, moles, and breakwaters and quays in the harbor.

Confronted with the great difficulties that are described in the report of Mr. Davis, and within about twelve months of actual operations, a solid pier has been extended about 1,000 feet into the sea, where the natural depth of the water is 14 feet. The channel to the leeward of this pier is rapidly deepening by the action of the sea and will soon be of sufficient depth to admit the passage of the largest vessels. A safe harbor for the largest ships at the entrance of the canal may now be considered as being assured at a very moderate expense.

Pure cold water is brought in steel pipes for a distance of 10 miles from the hills back of the city of America, on the coast. This gives much security to the health of those employed on the canal.

Provision for the health and comfort of all classes of employés has been carefully made by the company, and the results have been entirely satisfactory, as they are shown in the reports of the surgeon in chief.

The building of storehouses and accommodations for the comfort of the laborers, and providing them with good, wholesome food and clothing, has been of great advantage to the enterprise. All the work done by the company has been attended with careful regard to economy.

The heaviest part of the labor of clearing the dense forests from the line of the canal has been accomplished.

The great swamp of the Deseado River has been crossed with this clearing and the firm ground of the hills has been reached, where the forests are comparatively light and the wood is better for construction purposes. The wood found in the swamps being of light and soft texture decays rapidly, and in the dry season the felled forests are readily destroyed with fire. Between 10 and 12 miles of railroad has been built through this great swamp, and is ballasted with sand. It may be classed as a good and permanent road that supports heavy trains drawn by locomotives of 30 and 40 tons burden, and is sufficient for all the purposes of the construction of the canal, so far as it has been built.

This road is surveyed and located to its terminus at Ochoa, to which point a line of telegraph is in operation from Greytown.

The report of Mr. Davis shows the work that has been done on the Pacific Division of the canal and the great quantity of material and machinery that has been collected there, indicating enlightened and systematic industry and zeal on the part of the company.

This company has engaged the confidence of the Governments and people of Nicaragua and Costa Rica as to its ability and faithful purpose to construct the canal. Their earnest coöperation, thus secured, is an important element of success.

The committee consider that it is not necessary to recapitulate the facts, so fully stated in the papers appended to this report, as to the details of the work on the canal and its cost. No important facts are omitted, and none are unduly colored in statement, so far as the committee have been able to discover.

In some of these papers comparisons are made between the cost of this work and of its engineering difficulties with those works that enable sea-going vessels to reach Lake Superior from tide water on the St. Lawrence River.

Perhaps an accurate estimate cannot now be made of the cost of opening, maintaining, and improving the Welland Canal and the locks at Sault St. Marie, but the lowest calculation will bring the cost up to two-thirds of the sum that the Nicaraguan Canal will cost. The difference in elevation to be overcome is about 500 feet in favor of the route through lake Nicaragua, and the other physical difficulties are greater than those found on the Nicaraguan Canal. When the commerce of the Atlantic and Pacific Oceans is compared with that of the basins of our northern lakes it is obvious that the tonnage that will pass through the Nicaraguan Canal will be many times greater than that through our lakes in the interior.

Mr. Harvey in his report puts this matter in this strong light:

> If the tonnage of this canal route upon a water-course composed of a cluster of inland lakes, paralleled through their entire length by railways on both of their borders, and with competing adjacent water-courses as shown, has actually increased from 1,567,741 tons of freight in 1881, to 6,411,423 in 1888, and, presumably to 7,500,000 tons in 1889, what must be the traffic of the ship canal which bisects a hemisphere, saves 10,000 miles and fifty days of freight-steamer time between New York and San Francisco, and economizes proportionately in time and the distance to and from innumerable other commercial centers?

Mr. Harvey also estimates the freight tonnage passing through the Suez Canal in 1889 at 6,800,854 tons, which is 709,168 tons less than that of the Lake Superior Canal at Sault Ste. Marie.

There seems to be no reason to doubt that the Nicaragua Canal will be completed within six years from the date of the passage of the bill herewith reported to the Senate, and that commerce will force its way in ships from ocean to ocean, for the necessities of every maritime country coincide in an urgent demand for the early completion of this work.

SHALL THE GOVERNMENT OF THE UNITED STATES AID IN THE CONSTRUCTION OF THE CANAL.

The closing direction of the Senate is that this committee report its opinion as to what the interests of the United States may require in respect to the Nicaragua Canal, or, in other words, whether in view of existing circumstances it is for the interest of the United States to directly or indirectly aid the Maritime Canal Company in the execution of the work proposed, and if so to what extent and in what manner. This depends upon the ability of the Maritime Canal Company to construct the canal upon the basis of actual cost, so that the tolls and charges need not exceed a fair interest on such cost and the expense of maintenance and administration.

It is a matter of the highest importance that the charges upon the commerce of the world for the use of the improvement should not be

enhanced by interest and dividends on stock and bonds far in excess of the actual cost. It became therefore the first duty of the committee to ascertain whether the Maritime Canal Company intended to or could limit the stock and bonds of the company to the amount of money actually expended, and, if not, what additional stock or bonds would be required to cover contractors' risks, bankers' discounts, and bonus granted to induce investors to incur the real and imaginary risks of an investment that could yield no income until the work of six or seven years was completed.

Your committee therefore called before them the officers and engineers of the Maritime Canal Company, and also of the Construction Company employed by the Maritime Company to actually construct the work, to ascertain what contracts and agreements had been made between them and what plan was proposed to raise the large sum of money needed. A copy of the statements made and the documents furnished in the process of this examination are made a part of this report.

It appears from the estimate of A. G. Menocal, chief engineer, dated January 31, 1889, to the president and board of directors of the Nicaragua Canal Construction Company, that the cost of the work proposed, without interest and contingencies, was $65,084,176. It also appears by the report of the board of consulting engineers, revising the reports of the chief engineer, that the estimated cost is increased to $73,166,308. To this estimate they add for certain specified and unspecified contingencies of construction $14,633,262, making the total estimate $87,799,570. These estimates are based upon a plan of construction which contemplated that the work could be completed within six years. The interest accruing on the money actually invested as the work progressed, at the rate of 5 per cent., if the work was completed within six years, assuming an equal expenditure each year during the period of construction, would be equivalent to 15 per cent., or $13,000,000, making the aggregate of expenditure of money and accruing interest thereon for the full completion of the work of about $100,000,000.

This estimate, your committee is of the opinion, from such judgment as it can form upon the documents furnished, is a reasonable estimate of the cost of the completed work if paid for in money. There are elements of unavoidable contingencies which may largely increase this cost, such as grave financial disturbances that may advance the rate of interest, such legislation as will diminish the purchasing power of money, possible contingencies arising out of disturbances in the local governments of Costa Rica and Nicaragua, and from natural convulsions, storms, or earthquakes, which can not be foreseen and of which there is no reasonable fear. The estimates of the actual cost of the work and of contingencies seem to be sufficiently liberal to cover all probable expenditures, and lead your committee to the belief that the amount stated, $100,000,000, if furnished as needed without delay or impairment of value will be ample to complete the work proposed.

It became important in the first instance to ascertain how it was proposed by the Maritime Canal Company that this large sum should be raised. The statement of Mr. Hiram Hitchcock, president of the Maritime Canal Company of Nicaragua, and of Hon. Warner Miller, president of the Nicaragua Canal Construction Company, show clearly the plans proposed by the two companies to raise the money requisite.

The act incorporating the Maritime Canal Company of Nicaragua provides that the capital stock of said company shall consist of not less than 1,000,000 shares of $100 each, or $100,000,000, with the right to increase the capital stock to 2,000,000 shares of $100 each, or $200,000,000 on the vote of two-thirds of the stock of said company at any time outstanding. It also authorizes the company in the construction of said canal, and to carry out the purposes of the act, to issue its bonds and secure the same by mortgage on its property and rights of property of all kinds and descriptions, real, personal, and mixed, including its franchise to be a corporation. The amount of said bonds is not limited, but assuming, as the act contemplates, that it would be equal to the amount of stock outstanding, the amount of stock and bonds might range from $200,000,000, to $400,000,000, with authority to increase the amount of bonds to an indefinite extent.

Under the provisions of this charter the Maritime Canal Company entered into a provisional contract by which the canal company agreed to pay the Construction Company for the work proposed stock to the amount of $92,500,000, being the total stock authorized, less concessions to Nicaragua and Costa Rica, and $150,000,000 in bonds, an aggregate of $242,500,000. It was assumed that the bonds of the company, bearing interest at 5 or 6 per cent. per annum, could be sold at the rate of about 60 cents on the dollar, the rate at which the first bonds of the Suez Canal were sold. The stock was to be given to the contractors as a bonus to induce them to undertake the contract. In view of the difficulties in the way of the enterprise, your committee is of the opinion that the contract was as favorable a one as could be made, if we may judge by the contracts made for similar undertakings by private companies and in view of the risks and hazards of the future. The ability of the Construction Company to perform the work, even for this great sum, would depend entirely upon its ability from time to time to sell the securities of the Maritime Company.

Any stringency or fluctuation in the money market might prevent their sale and thus arrest the progress of the work. Any neglect on the part of the Governments of Nicaragua and Costa Rica to protect the contractors in the performance of the work would necessarily add to its cost, and, perhaps as in similar enterprises disable the company and forfeit their charter privileges. Any failure of the bankers purchasing these securities to pay for them according to the conditions of the sale would have the like effect. The work is so great and the benefits of its completion so transcendent that it would seem that its exe-

cution should not be left to private enterprise that, in the chances of the future, may fail. It is doubtful whether any private company, corporation or combination, however strong it may appear, would be able to complete so great an enterprise, one that could yield no income during its progress and could not in any event yield profit until after the whole enterprise was completed. Unlike railroads, the investment could not yield any income or profit until it was demonstrated by actual trial that commercial vessels could pass from ocean to ocean with reasonable facility and without delay or danger. In whatever view the committee could take of the enterprise there appears grave doubt whether it could be executed without the strong, certain, and powerful support of a great nation or a combination of nations.

Even if completed upon the plan proposed, the amount of stock and bonds outstanding would at 5 per cent. require that the tolls and other income of the company would yield $12,500,000 a year, a sum that would be so great a burden on the commerce of the world as to leave it questionable whether vessels would pass through the canal or follow the old course of navigation around Cape Horn. The gentlemen engaged in the enterprise are confident of their ability to execute the work. They did not express a desire for aid but seemed to have entire confidence of their success. They have already expended, as we are advised, about $4,000,000 and are negotiating contracts and loans.

The committee, however, felt grave doubts, and it was apparent that at all events the necessities of the company would compel them to sell their stock and bonds in the best market at a large discount. The stock and bonds would naturally flow into the hands of European bankers, and with them the ultimate control and government of the canal. For more than seventy years the United States has carefully adhered to the policy of the noninterference of European powers with the integrity or autonomy of American nations. This canal will be to the United States a part of its coast wise channel from the Atlantic States to the Pacific States. The concessions made by Nicaragua and Costa Rica are to an American company with stipulations and privileges in favor of the United States. The interests of the people of the United States are much greater in the proper management of the canal and in its free use at reasonable tolls than any foreign power.

The Maritime Company as now organized may be trusted to protect the interests of American citizens, but its willingness to do so may be changed by a change in the ownership of stock. Many examples of that kind have occurred when combinations and even foreign governments have bought the majority of the stock of a corporation with a view to its control. To leave the interests of the people of the United States dependent upon the cupidity of a corporation controlled necessarily by its changing its pecuniary interests and which may fall under the influence of rival powers would be to surrender the great advantages expected by our people from the use of the canal in shortening by over 10,000 miles

the passage of vessels from our ports on the Atlantic to our ports on the Pacific, as well as to endanger the vast trade that it is expected will spring up from the United States through the canal to the western ports of South America and to Asia and Australia. While the United States does not desire to have a monopoly of these benefits, but is willing upon just considerations to share them with all the nations of the world, yet we are more deeply interested than any other in making the burden of this transit as light as possible, and to secure its completion at a sum the interest of which will not be too great a burden upon commerce.

These considerations led your committee without division to the conclusion that it is the interest of the United States to make such a contract with the Maritime Canal Company as would certainly assure the completion of the canal within the period of six years at its actual cost in money, to be represented by bonds of that company guarantied by the United States, which in any state of the money market would be sold at not less than par, the United States to be indemnified against liability on its guaranty by a pledge of a majority of the capital stock of the company with power to vote such stock. Thus, without loss to the United States, it would secure the early and complete construction of the work at its actual cost and such reasonable control of the transit as would give to our citizens at least equal advantages in the use of the canal.

In this way, assuming that the estimate of the cost of the canal is reasonable, which the committee propose to have tested by United States engineers, the United States could secure to the people of Nicaragua and Costa Rica (who from their position are most interested in the canal), to the people of the United States, who will probably maintain the largest commerce over it, as well as to all the nations of the world, the use of the canal at the lowest tolls that will reimburse and save harmless the United States from its guaranty, and yet will yield to the actual builders of the canal moderate profits, without watered stock or discredited bonds resulting in unnecessary burdens upon vessels passing through its waters.

This has been the object of the United States in all the treaties made and negotiations had with the Central American States and other foreign powers during a period of seventy years. Every President since and including Mr. Monroe has participated in this negotiation, and all of them have favored the construction of an interoceanic canal from the Atlantic to the Pacific across the isthmus to be practically under the control of the United States, but to be open to the commerce of the world. To secure the best practicable route the United States has conducted many elaborate and expensive surveys, with full details as to every route proposed from Mexico to Colombia, resulting in the concurring judgment of nearly all the engineers and officers of the Army and Navy that the route proposed by way of Lake Nicaragua is the best.

In communicating some of these surveys to the Senate, President Hayes thus stated the American doctrine in respect to the proposed canal:

> The policy of this country is a canal under American control. The United States can not consent to the surrender of this control to any European powers. If existing treaties between the United States and other nations, or if the rights of sovereignty or property of other nations stand in the way of this policy—a contingency which is not apprehended—suitable steps should be taken by just and liberal negotiations to promote and establish the American policy on this subject, consistently with the rights of the nations to be affected by it.
>
> The capital invested by corporations or citizens of other countries in such an enterprise must, in a great degree, look for protection to one or more of the great powers of the world. No European power can intervene for such protection without adopting measures on this continent which the United States would deem wholly inadmissible. If the protection of the United States is relied upon, the United States must exercise such control as will enable this country to protect its national interests and maintain the rights of those whose private capital is embarked in the work.
>
> An interoceanic canal across the American isthmus will essentially change the geographical relations between the Atlantic and Pacific coasts of the United States, and between the United States and the rest of the world. It will be the great ocean thoroughfare between our Atlantic and our Pacific shores, and virtually a part of the coast line of the United States. Our mere commercial interest in it is greater than that of all other countries, while its relation to our power and our prosperity as a nation, to our means of defense, our unity, peace, and safety, are matters of paramount concern to the people of the United States. No other great power would, under similar circumstances, fail to assert a rightful control over a work so closely and vitally affecting its interest and welfare.

Mr. Evarts, then Secretary of State, in the same connection said:

> The natural interest of the United States in any connection through the American Isthmus has not only been always emphatically expressed by the government, but it has been fully and distinctly recognized by other governments from the earliest period of our national existence.

By the treaty negotiated in 1884 between the United States and Nicaragua the canal was to be built by the United States. It was still pending in the Senate when Mr. Cleveland became President. He withdrew it, not from opposition to its general purposes, but because, as he states in his annual message of December, 1885, it was "coupled with absolute and unlimited engagements to defend the territorial integrity of the States where such interests lie." He held that this clause was an "entangling alliance," inconsistent with the declared public policy of the United States. This objection led to the concessions by Nicaragua and Costa Rica to private persons, and the incorporation by the United States of the Maritime Canal Company of Nicaragua.

These concessions and the charter provide expressly that the United States may aid the company by a subscription of stock or otherwise. If such aid is rendered it must be rendered now. If the Maritime Canal Company is to enter the money market without our aid as a borrower of $100,000,000 to be expended within six years, it must execute its mortgage now for an amount that will probably yield that sum as needed. The swollen cost will largely fall upon the people of the United States

in the form of tolls. If the work is, as we confidently believe, one of transcendent value to the United States—worthy to be done by a great nation—which will cost only its credit without being a burden to the taxpayer, one that will not in any event cripple its resources, but will be a monument of its power and its beneficence more enduring than the monuments of antiquity, a realization of the dreams of all nations for four centuries, it ought to be undertaken not by a corporation alone, but aided by the United States for the benefit of the American continent and the commercial world. It is an act worthy to commemorate the beginning of the second century of our existence as a nation and of the public policy upon which we have entered of uniting the Republics of America by works of peaceful development.

The practical difficulty of the committee was in determining in what manner and to what extent the United States should aid in this enterprise. Nicaragua and Costa Rica were quite willing that this Government should directly construct the work, but for the reasons stated the treaty for this purpose was not ratified. The Maritime Canal Company was interposed by act of Congress. Composed exclusively of citizens of the United States, they were not desirous of surrendering what they regarded as a favorable business enterprise. The plan proposed in the accompanying bill was dictated by this committee, and, after many conferences, agreed to by that company, subject to the approval of Congress. The company is now actively engaged in construction, and it is but fair to it that if the bill is to become a law Congress should act as speedily as possible, so that the company may not be delayed in its contracts.

The bill herewith reported is founded upon the theory that the cost of the completed work shall be represented only by bonds and stock to the amount of money actually spent in construction and the accruing interest paid in its progress.

The bill proposes to limit the stock of the Maritime Canal Company to 1,000,000 shares of $100 each and no more. By the concessions of Nicaragua that country is entitled to 6 per cent. or $6,000,000 of the stock of the company for the liberal grants made to and privileges conferred by that country upon the Maritime Construction Company, a copy of which is hereto attached. Costa Rica for similar concessions on her part is entitled to $1,500,000 of this stock.

By the terms of these concessions the Maritime Canal Company became entitled to $12,000,000 of the capital stock, and this amount has been, by the agreement with the Construction Company, transferred to the latter company. The agreement heretofore referred to between the Maritime Company and the Construction Company provided for the transfer of the residuum of the stock and also 150 million dollars of bonds to be issued in payment for the work as performed. By that agreement the ownership and control of both companies would follow the ownership of the stock and bonds. By the bill proposed all certi-

cates of stock and all contracts, assignments, and transfers of stock other than the stock to which the Governments of Nicaragua and Costa Rica are to be surrendered and canceled, except the sum of $3,000,000, which is to be retained by the Maritime Company or its stockholders in full payment and satisfaction of the concessions and agreements and advantages obtained by them.

The United States is to reimburse the Maritime Canal Company the amount expended in promoting the enterprise and in the surveys and construction of the work thus far performed, including all expenditures in connection therewith upon statements to be made, but subject to the approval of the Secretary of State and the Secretary of the Treasury. The canal shall thereafter be constructed from the proceeds of the bonds of the Maritime Company, guarantied, as aforesaid, in payments as the work progresses, not less frequently than every sixty days. All contracts or engagements of whatever name or nature now existing or outstanding not consistent with the provisions of the bill are to be canceled and set aside, and the work is to be proceeded with upon estimates made by United States engineers and to be paid for at actual cost by bonds, or the proceeds of bonds, of the kind and description mentioned. All the expenses of the work, including interest on the guarantied bonds issued, are to be paid by the Maritime Canal Company of Nicaragua, and upon the failure of said company to pay the interest as it accrues, it is to be paid by the United States. The interest proposed on the bonds is 3 per cent., payable quarterly, and running for a period of twenty years.

To indemnify the United States from all liability upon its guaranty $70,000,000 of stock of the Maritime Company is to be deposited with the Secretary of the Treasury and no stock other than that already named is to be issued except when, in the opinion of the President of the United States, the installments of the mortgage bonds shall be insufficient to meet the current requirements of the company in respect to the enterprise. The Secretary of the Treasury has power, at his discretion, to vote the stock pledged to the United States, either in person or by proxy, at any meeting of the stockholders of said company, and the United States is entitled to a representation of six members upon the board of directors composed of fifteen persons.

These, in brief, were the terms suggested by your committee to the Maritime Canal Company and the Construction Company, and, after many conferences, a full report of which is hereto attached, the officers of said companies agreed to the terms and conditions proposed. This bill, if it should become a law, would, in the opinion of your committee, secure, without reasonable doubt, the prompt completion of the Nicaragua Canal at its actual cost, and secure to the United States a reasonable and proper control in conformity with the concessions granted by Nicaragua and Costa Rica. The management and conduct of the work is left with the Maritime Company, but under such restraints as will

insure economy and with the strongest inducement to limit its obligations to the actual cost of the work, so that the tolls upon it will not be swollen to pay for watered stock or bonds of doubtful credit.

The United States becomes a party strong enough to cope with the magnitude of the enterprise, and to give confidence not only to its securities, but to its safety from injury from internal or external forces. It is believed by your committee that the United States will not be called upon to pay any portion of the principal or interest of the bonds, but that the work itself will amply repay all its cost, and yield its benefits not only to the people of Nicaragua and Costa Rica, but to the civilized world. If it appeared at any time that the interests of the United States are in jeopardy from any cause, it can purchase the majority of the stock and become the controlling owner of the canal by paying its own bonds to an equal amount, and the property, tolls, income, and profits of the canal will be an ample security against the obligations it assumes.

The committee therefore recommend the passage of the bill.

JOHN SHERMAN, *Chairman.*
GEO. F. EDMUNDS.
WM. P. FRYE.
WM. M. EVARTS,
J. N. DOLPH.
JOHN T. MORGAN,
JOSEPH E. BROWN
H. B. PAYNE.
J. B. EUSTIS.

APPENDIX 1.

TABLE SHOWING DISTANCES IN MILES BETWEEN COMMERCIAL PORTS OF THE WORLD AND DISTANCES SAVED BY THE NICARAGUA CANAL.

From—	Via Cape Horn.	Via Cape of Good Hope.	Via Nicaragua Canal.	Distance saved.
New York to—	*Miles.*	*Miles.*	*Miles.*	*Miles.*
San Francisco	14,840	.....	4,946	9,894
Behring Strait	17,921	.....	8,026	9,895
Sitka	16,105	.....	6,209	9,896
Acapulco	13,071	.....	3,122	9,949
Mazatlan	13,631	.....	3,682	9,949
Hong-Kong	18,180	15,201	11,038	4,163
Yokohama	17,679	16,190	9,363	6,827
Melbourne	13,502	13,290	10,000	3,290
New Zealand	12,550	14,125	8,680	3,870
Sandwich Islands	14,230	.....	6,388	7,842
Callao	10,689	.....	3,701	6,988
Guayaquil	11,471	.....	3,053	8,418
Valparaiso	9,750	.....	4,688	5,062
New Orleans to—				
San Francisco	15,052	.....	4,047	11,005
Acapulco	13,283	.....	2,409	10,874
Mazatlan	13,843	.....	2,969	10,874
Guayaquil	11,683	.....	2,340	9,343
Callao	10,901	.....	2,988	7,913
Valparaiso	9,962	.....	3,987	5,975
Liverpool to—				
San Francisco	14,690	.....	7,694	6,996
Acapulco	12,921	.....	5,870	7,051
Mazatlan	13,481	.....	6,430	7,051
Melbourne	13,352	13,140	12,748	392
New Zealand	12,400	13,975	11,349	1,051
Hong Kong	18,030	15,051	13,786	1,265
Yokohama	17,529	16,040	12,111	3,929
Guayaquil	11,321	.....	5,890	5,431
Callao	10,539	.....	6,449	4,090
Valparaiso	9,600	.....	7,436	2,144
Sandwich Islands	14,080	.....	9,136	4,944
Spain to Manilla	16,900	13,951	13,520	431
France to Tonquin	17,750	15,201	13,887	1,314
Hamburg to—				
Mazatlan	13,931	.....	6,880	7,051
Acapulco	13,371	.....	6,320	7,051
Fonseca	11,430	.....	5,530	5,900
Punta Arenas, Costa Rica	11,120	.....	5,515	5,605

From—	To eastern entrance of Nicaragua Canal.	From—	To western entrance of Nicaragua Canal.
	Miles.		*Miles.*
New York	2,021	San Francisco	2,776
Liverpool	4,769	Valparaiso	2,518
Hamburg	5,219	Callao	1,531
Amsterdam	4,994	Portland	3,219
Havre	4,874	Victoria	3,428
Cadiz	4,220		
New Orleans	1,308		

NOTE.—The distances are measured by customary routes most convenient for sailing ships and slow freight steamers.

APPENDIX A.

THE NICARAGUA CANAL—ITS DESIGN, FINAL LOCATION, AND WORK ACCOMPLISHED.

[By A. G. MENOCAL, *Chief Engineer Nicaragua Canal Construction Company, (U. S. N., M. AM. SOC. C. E., etc.)*]

The idea of establishing a waterway across the American isthmus dates back from the beginning of the sixteenth century, when the early navigators, perceiving the narrow neck of land separating the two oceans, were forcibly impressed by the advantages to be derived by cutting a canal through it. The Isthmus of Panama, being the narrowest part of that strip of land, and Nicaragua, on account of the evident natural facilities presented by the lake and its outlet, the river San Juan, have always been the main points of attraction as possessing the most favorable features for doing the work, and as early as 1550 the Portuguese navigator Antonio Galvao proposed four routes; one of which was by way of Lake Nicaragua and the San Juan River, and another through the Isthmus of Panama. As the configuration of the isthmus became better known, the belief in the practicability of joining the two oceans by a canal gradually increased; but it was not until the beginning of the present century, when through the indorsement of Humboldt, who had studied the problem on the ground, and later on through the united efforts of the Central American Republics, that the question commenced to assume a well-defined shape. But, while these States and the Republic of New Granada were anxiously soliciting the cooperation of other nations and of capitalists in favor of the undertaking, no regular surveys had been made of any portion of the isthmus; the routes proposed and claimed to have been discovered being the result of imperfect reconnoissances or of the imagination. It was evident, moreover, that the work would require the expenditure of large sums of money; and, while it was universally admitted that the canal would be of great advantage to the world at large, it was not equally clear that the probable traffic seeking it would be sufficient to pay interest on the capital invested. But the gold discoveries following the acquisition of California by the United States, and the subsequent rapid development of the vast commercial and agricultural interests of the Territories lying on the Pacific slope, exerted a powerful influence in attracting attention to the commercial and political importance of the canal. What had until then been regarded as a humanitarian scheme or a geographical desideratum became a political and commercial necessity, and the attention of the American statesmen, capitalists, and scientists was at once directed to finding the most practical solution of the problem.

The idea of establishing a continuous water communication between the two oceans has been always recognized as the only means of satisfying all the requirements of commerce, but a satisfactory solution of all the unknown quantities entering into such a vast undertaking could not be reached without serious surveys of the isthmus, and these required time and the adjustment of political difficulties with other nations interested in the proposed work. In the mean time the Americans, anxious to meet the increasing demand for means of communication between the two oceans consequent to the rapid development of the Pacific coast, turned their attention to an overland route, and, having obtained a concession from the Republic of New Granada, in 1849 organized a company and intrusted the surveys for a railroad to Col. G. W. Hughes and J. C. Trautwine, well-known civil engineers. This was the first authentic survey made across the isthmus, and resulted in the construction of the Panama Railroad between 1850 and 1855.

In the meantime the Government of the United States, alive to the importance of the canal, had ordered a reconnaissance of the Isthmus of Tehuantepec, and, by diplomatic negotiations with Nicaragua, had encouraged and supported the organization of the Atlantic and Pacific Ship Canal Company, which had obtained from Nicaragua the right to build the canal, and, pending the completion of the work, to

establish a transit between the Caribbean Sea and the Pacific Ocean, to facilitate the commerce between the two oceans, by way of the river San Juan and Lake Nicaragua.

This company intrusted the survey for a ship canal to Col. O. W. Childs, a conscientious and able engineer. He examined in 1850 several routes between Lake Nicaragua and the Pacific Ocean, and is entitled to credit for the discovery of the lowest depression in the Cordilleras between the Arctic Sea and Cape Horn. Through this divide, which he found to be 152 feet above sea level, he located a route for the canal extending from the mouth of the river Lajas, on the west shore of the lake, to the Port of Brito, or the Pacific, the main features of which have stood the test of many subsequent surveys and rectifications in that region, and have been incorporated in the plan of the final location of the canal across that country. Col. Childs's plan contemplated the use of the lake as the summit level, and of the valley of the river San Juan, its outlet, to its delta, through which he proposed to excavate a canal following the left bank of the river to Greytown. This survey was the first on the isthmus for a ship canal conforming to the requirements of engineering, and its accuracy has been fully confirmed by subsequent explorations.

Much might be said here to show the great interest evinced by the Government of the United States in the building of a canal, and to demonstrate the fact that the only thorough surveys made on the isthmus with the view of establishing the practicability and cost of the work have been done either by the Government directly or by American citizens under its auspices.

It is interesting and instructive to follow, step by step, the American explorations on the isthmus from Tehauntepec to the Gulf of Darien, but this paper deals with the proposed Nicaragua Canal, which is believed to be the only practicable route for connecting the two oceans by a ship canal. This conclusion is the result of forty years of exhaustive studies over the whole isthmus and of a valuable lesson so dearly taught by an unfortunate attempt to prove the practicability of building a canal by the expenditure of vast sums of money in useless excavations and wild schemes for removing insuperable natural obstacles prior to a thorough examination of the physical conditions.

The period from 1870 to 1876, during the administration of General Grant, was one of marked activity in the explorations of the isthmus, and it may be said that the question as to the route possessing the greatest advantages was settled in February, 1876.

The commission appointed by President Grant in 1872 to report upon the various plans submitted by the surveying parties consisted of General A. A. Humphreys, Chief of the United States Corps of Engineers; Mr. C. P. Patterson, Superintendent of the Coast Survey, and Commodore Daniel Ammen, Chief of the Bureau of Navigation of the Navy Department.

On February 6, 1876, the commission submitted its decision to the President of the United States, in which it was said: "After a long, careful, and minute study of the several surveys of the various routes across the continent, we unanimously report that the route known as the Nicaragua route possesses, both for the construction and maintenance of a canal, greater advantages and offers fewer difficulties from engineering, commercial, or economical points of view than any of the other routes shown to be practicable by surveys sufficiently in detail to enable a judgment to be formed of their relative merits, as will be briefly presented in the appended memoranda."

The routes considered by this commission were the Tehauntepec, the Nicaragua, the Panama, and the Atrato-Napipi. The surveys conducted by the Government of the United States at other points did not develop physical conditions favorable enough to justify a location sufficiently in detail to form an estimate of the cost, and the results of the explorations were examined by the commission only in so far as was necessary to show their impracticability or inferiority as compared to other routes.

The survey of the Nicaragua route by the United States Government was commenced in March, 1872, and continued until July, 1873. Eight different routes between the lake and the Pacific were carefully examined. The correctness of Childs's survey from the mouth of the river Lajas to Brito was carefully confirmed, and, while the low divide was a strong feature in favor of his location, the problem of properly draining the valley of the Rio Grande was not at the time satisfactorily solved, and the next best route, extending from the mouth of the small stream Del Medio at the lake north of Lajas to a point on Childs's line 9 miles west of the lake, and thence following Childs's line to Brito, was adopted and carefully located.

In this, as in all projects for a canal across Nicaragua, the lake was taken as the summit level, and in this location its mean level was assumed to be 107 feet above sea level. East of the lake slack-water navigation was secured in the river San Juan for a distance of 63 miles by the construction of four dams, the lower dam being below the confluence of the San Juan and San Carlos Rivers. Below that point the canal was proposed to be excavated for a distance of 41.9 miles on the right bank,

and following the general direction of the river to the outlet, San Juanillo, where it turned almost directly to Greytown. Twenty-one locks, with an average lift of ten feet, were proposed; ten on the Atlantic and eleven on the Pacific slope. This project was a decided improvement on that proposed by Childs, but in its general outline the design did not differ very materially from his. Its main features were as follows:

Canal in excavation	61.74
Slack-water navigation in the River San Juan	63.02
Lake navigation	56.50
Total miles from ocean to ocean	181.26
Number of locks	21
Number of dams across the river San Juan	4

The total cost was estimated at $65,222,147.

The writer, who had been the chief engineer of the Government surveys, recognized the practicability of the canal by this route, but was not satisfied with the location. The Lajas line, with its low divide of 152 feet, had been reluctantly abandoned on account of difficulties in the drainage problem, and the Medio route, with 90 feet greater depth of cutting, had been adopted instead, thereby increasing the difficulties in construction and by several millions of dollars the cost of the work.

In the Eastern Division the frequent interruptions of the river navigation by the interposition of dams was not a desirable feature, and the sharp curves and too close proximity of the canal, in excavation to the river, in several places, should, if possible, be eliminated from the problem. There were, also, too many locks, which together with the long stretch of canal in excavation, would necessarily tend to retard navigation and restrict the capacity of the canal for traffic.

The Government surveys were intended to show the practicability of the canal, and that object had been fully attained in the comparatively short time devoted to the work, but it was quite evident that before the project was finally adopted as a commercial enterprise, important modifications should, and could, in my opinion, be introduced in the original designs. To what extent this has been accomplished will be shown in the description of the route finally located and adopted by the present Nicaragua Canal Construction Company. In 1876–'77, while surveying the delta of the San Juan and harbor of Greytown for the purpose of devising plans for the improvement of the navigation of the river and the restoration of the harbor, I had occasion to make extensive reconnoissances in a direct line connecting Greytown with the end of slackwater navigation in the San Juan River, my object being to find, if possible, a direct route joining those points, in lieu of the long and tortuous line following the bank of the river. These explorations, conducted from both ends of the desirable location, and in opposite directions, could not be completed within the time then at my disposal. There remained a gap of 4 or 5 miles yet to be examined, but, so far as carried out, the results of the explorations were extremely gratifying, with strong indications of physical conditions favorable to a satisfactory solution of the problem.

In 1880 I devoted my attention to a rectification of the Lajas location, and succeeded so far as to reduce the length of the route by 1¼ miles; eliminate several curves and enlarge the radius of others; decrease the amount of excavation in the narrow valley of the Rio Grande, and, what was of the greatest importance, found a satisfactory solution of the drainage problem by diverting the waters of the Grande, above its confluence with the canal, through an artificial channel, and the rivers Juan Davila and Lajas into the lake, thus leaving the narrow valley of the stream free for the canal.

That much having been accomplished in the Western Division towards the contemplated improvement of the original location, a greater interest was naturally felt for a thorough rectification of the eastern section. In 1885 the Government of the United States, immediately after having completed a treaty with Nicaragua for the construction of the canal, directed me, at my own suggestion, to proceed to Nicaragua with a party of competent assistants and ascertain the practicability of introducing favorable modifications in the eastern section of the canal location. The results attained by this last examination, together with what had been previously secured west of the lake, were all calculated to attract the attention of engineers and capitalists, and the organization of the company chartered by the United States Congress and now building the canal, soon after followed. The results of this survey can be found in detail, in book form, in my report to the honorable Secretary of the Navy, dated November, 1885, and entitled "Report of the United States Nicaragua Surveying Party" (Ex. Doc. No. 99, Forty-ninth Congress, first session).

The company was well aware, however, that while these surveys were ample to prove the practicability of the canal, and sufficient in detail to arrive at an approximate cost of the work; yet they were only intended as a preliminary location, and

more thorough studies, comprising the minutest details, were still wanted before actual construction could be commenced. Therefore the first work undertaken by the company, immediately after its organization, was to fit out and send to Nicaragua a numerous corps of competent engineers, with instructions to make a thorough relocation of the whole route and accessory works, so as to eliminate all doubtful elements and to arrive at an accurate estimate of the character, amount and cost of all the work required for the completion of a canal ample for the navigation of the largest ships afloat, and the passage of the maximum traffic likely to seek it.

Six land surveying parties, one hydrographic party, and two boring parties, have been for two years and a half making this verification, and although the axial distance of the land survey (exclusive of the lake and river) is less than 50 miles, the length of lines actually surveyed by transit and level, in cross-sectioning, location of locks, dams, embankments, railroads, flowage lines, drains, etc., is not less than 4,000 miles, or at the rate of 40 miles of actual instrumental survey for every mile of final location. The result of this laborious work has been a verification of the location of 1885 in its essential features, but with marked improvements in the details, and the final location of the route upon which the canal is now being constructed, and which I will proceed to describe in a concise form.

THE PROPOSED ROUTE.

San Juan del Norte (Greytown) on the Atlantic, and Brito on the Pacific, are the termini of the canal, the total distance from port to port being 169.448 miles, of which 26.783 miles will be excavated canal and 142.659 miles free navigation by Lake Nicaragua, the river San Juan, and through basins in the valley of the streams Deseado, San Francisco, and Tola. Lake Nicaragua is necessarily the summit level of the canal, and its elevation above mean sea level is taken at its mean at 110 feet. It will be connected with the Pacific by two sections of canal in excavation and the Tola basin, and with the Atlantic by slackwater navigation through the valley of the river San Juan, and a series of basins in the valleys of the San Francisco and Deseado, connected by short sections of canal, the sea level on each side being reached by three locks which have been located as near as possible to the extremities of the canal, viz, 3½ miles from Brito and 12¾ miles from Greytown, thereby giving a clean summit level of 153¼ miles in extent out of a total distance of 169½ miles, as stated above. For purposes of description the route has been divided into four divisions, viz, Eastern, San Francisco, Lake and River, and Western.

Eastern Division.

[From thei nner harbor of San Juan del Norte (Greytown) to the San Francisco Basin, 18.864 miles.]

The line selected and located starts from the inner harbor of San Juan del Norte and extends in a southwesterly direction for a distance of 9,297 miles to Lock No. 1, in the valley of the small stream Deseado, which descends from the high ridge separating the valley of the San Juanillo from that of the Caño San Francisco. Where the stream Deseado interferes with the course of the canal, it is to be diverted by artificial channels. These first 9.297 miles of canal will be at the level of the sea, forming practically a prolongation of the harbor of Greytown, the width proposed allowing ample room for the passage of vessels going in both directions. The excavation will be entirely through flat, alluvial deposits, as shown by the numerous borings taken along the whole line.

The first lock from this reach will have a lift of 30 feet, and the uniform dimensions of chamber adopted for all the locks, viz: 650 feet long and 70 feet wide. A suitable rise of ground for the site of the lock is met with in the lower valley of the Deseado. From the head gate of Lock No. 1, to Lock No. 2, the canal follows the valley of the Deseado, which is here partially flooded by the construction of four low embankments connecting the site of Lock No. 1 with the sides of the valley. In this manner the canal excavation, which here consists chiefly of stiff red clay underlying a thin stratum of loam, is much reduced, and the drainage economically and efficiently controlled by suitable weirs of maximum flood capacity.

Lock No. 2, located 1.258 miles above the head gate of Lock No. 1, has a lift of 31 feet and will rest on solid ground, a hill on the south side of the valley affording an excellent site for it.

Lock No. 3, with a lift of 45 feet, is located 12¾ miles from Greytown and 1.927 miles from the head gate of Lock No. 2. This section of the canal occupies the lower basin, made in the valley of the Deseado by the erection of a dam 38 feet high and 1,300 feet long across the stream, and two embankments of an aggregate length of 1,400 feet and about 20 feet high, on the top of the confining ridges. The only excavation needed through this basin is in cutting across three low hills of red clay.

At this point the valley of the Deseado is spanned by an embankment 70 feet high and 1,050 feet long, resting on two high hills, and the gaps on the ridge connecting

this embankment with the sides of the valley are closed with small embankments aggregating 5,800 feet on the crest, with an average height of 20 feet to the level, 112 feet above sea level. By this means a basin 3.086 miles long is created in the valley of the stream in which a depth of from 30 feet to 70 feet is obtained, without excavation, for a distance of 2.598 miles. It is proposed to retain the water in this basin at an elevation of 106 feet above sea level; in other words, the summit level of the canal is carried across the "divide" and extended to Lock No. 3, or to within 12¾ miles of the Atlantic, and but 3½ miles from the sea level, which, as stated above, reaches 9¼ miles up from Greytown. The advantage of these two large reservoirs in close proximity to the locks need not be commented upon, and the facilities afforded as a "turnout" for ships in waiting and traveling in opposite directions can not be overestimated. The dam is proposed to be built of stone or what is termed "rock-fill," with earth backing, and will have a weir 600 feet long on the crest, and a fall of 45 feet for the discharge of the surplus water into the lower basin. This will be supplemented by another weir 800 feet long, located on the south side of the valley in a gap between the hills inclosing the upper basin, giving a total length of weir of 1,400 feet.

At the western extremity of this basin begins the Eastern Divide cut, connecting the valley of the Deseado with that of the Caño San Francisco. This cut is 2,917 miles long, has a maximum cut of 298 and average depth of 111.2 feet above the level of the water, the depth in the canal being 30 feet, and contains about 21 per cent. of the total excavation estimated for the whole canal.

The magnitude of this work grows less striking as we proceed to examine its importance as a factor in the solution of the problem, the local advantages for its execution, its permanency when finished, and the advantageous and economical disposition of the material to be excavated.

First.—It will be observed that this cut is almost in a direct line between Ochoa and Greytown, which are the two objective points of the canal; the former being the point at which it must, of necessity, leave the San Juan River, and the latter equally necessary as its terminus on the Atlantic.

Second.—It is the lowest point along the whole ridge which intervenes between these two points, and nearly equidistant from each.

Third.—It is also the narrowest pass, by several miles, of any other on the ridge, the valleys of the Deseado on one side and the San Francisco on the other, here penetrating it farther than elsewhere, thus allowing the greatest possible extension of their basins with the least excavation.

Besides the above there are several other important advantages connected with this particular pass entitled to much consideration.

First.—The material to be removed is in the main solid rock; therefore the volume of excavation is reduced to a minimum, and the cut, when made, will remain so forever without further expense.

Second.—The material is needed for the construction of the dam at Ochoa, for the embankments between Ochoa and Greytown, for the construction of the locks, for the breakwater at Greytown, and for pitching the sides of the canal, and the surplus can be dumped in the immediate vicinity.

Third.—The center of distribution is most conveniently located, and were not this material available, at the sole expense of transportation down grade, it would have to be obtained at considerable cost from quarries in the vicinity, as there is no rock easy of access between Ochoa and Greytown, except in this ridge.

Fourth.—The locality is one of the healthiest in Nicaragua, the drainage is perfect, and water abundant and excellent for domestic uses.

Fifth.—There is close at hand on both sides of the ridge an inexhaustible water power for the economical and convenient operation of all the machinery required to do the work.

Possessing, therefore, as it does, this truly marvelous coincidence of favorable circumstances, it would seem as though the very hand of nature had made this particular spot with the view of facilitating the execution of the greatest undertaking of this or any other age. With proper appliances and good management, so much of the work in the adjacent sections being dependent upon the material to be got from this cut, an even rate of progress can easily be maintained and the whole work be pushed to completion well within the six years estimated as the time for completing the canal.

San Francisco Division, 12.500 *miles.*

[From the western end of the Divide cut to the River San Juan at Ochoa.]

On the western slope of the divide, the canal follows the valley of the Limpio for 1.477 miles to the end of the cut. Before falling into the San Francisco basin it passes for .738 miles through a rolling country in the lower valley of the Limpio, the average depth of the cutting for this distance being 16 feet above the bottom of the canal.

Passing into the basin of the Caño San Francisco it follows the valleys of the Limpio and Chanchos to near the confluence of the latter with the San Francisco, and then up the valley of the last-named stream, skirting the hills on the west to a favorable pass in the hill range separating this valley from the swampy region called Florida Lake, extending towards Ochoa. The line of location follows this swamp to its western extremity, where it strikes the high rolling country intervening between this low region and the valley of the Machado, and following a tributary of the latter, it enters the River San Juan, 1,600 feet above the mouth of the Machado. The distance from the western end of the divide cut to the bank of the River San Juan is 12.500 miles, of which 7.481 miles are tangents and 5.019 miles comprised in eleven curves of from 4,000 to 11,459 feet radius. The hills surrounding the basin on the south do not form an unbroken range rising at all points above the level of the water, which, in this section also, is maintained at 106 feet above sea level. Eight gaps will have to be closed by embankments aggregating in length to 2,440 feet, measured on the valley floor, and 12,260 feet on the crest, the maximum depth being 60 feet below the level of the water in the basins.

In addition to the above, 59 smaller embankments, aggregating in length 18,280 feet on the crest, rising 6 feet above water level and varying in height from 1 to 50 feet, will be required from Ochoa to the main ridge of the divide. All embankments resting on the valley or swamp level are designed of rock fill and earth-backing, with three parallel rows of sheet piling between abutments.

The total length of basin secured by this plan is 11.267 miles from flowage line to flowage line, of which 8.697 miles are in water varying from 30 to 60 feet in depth. That is, of the 12.500 miles in the division, but 1.233 miles will be wholly, and 2.570 miles partly, in excavation. This is not, however, the only advantage gained by the creation of this basin. Without it the cut across the divide would be of such proportions as to make the route commercially impracticable, and the basin of the Deseado an impossibility. Not less important are the additional considerations of free navigation through a wide and deep basin, instead of a restricted excavated channel. In the former, vessels can travel at full speed, lie at anchor, or pass each other at all points, while in the latter, the position and speed of all ships must conform to rigid regulations.

Attention is also invited to another striking feature of this work, as compared with that close to the bank of the San Juan.

In a country subject to observed rainfalls of more than 6 inches in twenty-four hours, the problem of drainage involves a contest with forces of nature whose enormous destructive powers are a constant menace to engineering works, however careful and skillful their design and execution. And it is of the utmost importance, therefore, to reduce these forces to a minimum before the construction of works to withstand them.

The large territory embraced between the ridge confining the basin to the south and the "lower route," which term is used to designate the canal line formerly proposed, and which lies on the right bank of the San Juan River to Greytown, is, by the adoption of the "upper route," or that over which the canal is being built, entirely eliminated from the problem of drainage, leaving only that portion of the watershed north of the ridge, from the divide to the valley of the Machado, to be provided for. The area of this catchment basin is about 65 square miles.

It is proposed to build all embankments across the valleys in the disconnected portions of the ridge, of rock fill and earth backing, the crest to be 107 feet above sea level, and with the top and outer slope so shaped and paved with large stones as to admit the free flow of water over the surface without danger of injury, all other embankments to be 112 feet above sea level. All these embankments will be, in fact, so many waste weirs for the discharge of the surplus water at several points in the basin, with an aggregate length of 4,720 feet of spillway, and assuming that the embankments are perfectly tight, which will not be the case until several years after construction, and, therefore, that all the surplus water passes over the weirs, the maximum depth on the crest will not exceed 15 inches.

An extraordinary freshet in the San Juan above the dam would probably send some of the river water towards the basin, but it will be observed that the weirs in the basin alone are capable of discharging 90,200 cubic feet per second before the water reaches the top of the high embankments, and that, in such extreme cases, the basin would also be discharging through the divide cut, over the Deseado Dam and weirs, and, if need be, through the culverts of lock No. 3. As an additional precaution a guard gate is provided in the first cut east of the Machado, by which the waters of the river San Juan may be shut off from the basin. With these ample provisions the destruction of the smaller earth embankments by an overflow of the basin seems to be well guarded against.

Lake and River Division, 121.04 *Miles.*

[From Ochoa to Western Coast of Lake Nicaragua

This division extends from the western extremity of the San Francisco Division in the valley of the Machado to the entrance of the canal on the west shore of Lake Nicaragua. The total distance is 121.04 miles, divided as follows: navigation by the river San Juan, 64.54 miles; Lake Nicaragua, 56.5 miles. The section of the river from Ochoa to the Lake is to be made navigable by the construction of a dam at Ochoa, just below the Machado, maintaining the water at the summit level of 106 feet above sea level. It may be here explained that this elevation, hitherto treated as the summit level, is 4 feet below the lake, a fall of three-quarters of an inch to the mile being allowed for the slope necessary to discharge its waters, although for all the purposes of navigation that portion of the river is converted into an extension of the lake.

The dam is located between two steep hills, and its length of weir on the crest will be 1,250 feet, and abutments 650 feet. The average depth of the water in the river was, at the time of the survey, 8 feet, and the maximum depth, close to the southern abutment, 14 feet, the width between the banks being 950 feet. With a mean flow in the river of 20,000 cubic feet per second, the depth of water on the top of the weir will be about 3½ feet.

The dam is proposed to be built of rock fill and earth backing, in all respects similar to all the other large embankments and weirs already described. Its average height above the river bottom is 61 feet, its thickness at the top, 25 feet, and at the bottom, 500 feet. The core of the rock portion will be made of smaller stones, gravel, and refuse from the rock cuts, with three rows of sheet piling from abutment to abutment, and substantial concrete core walls from the ends of the sheet piling carried well into the abutment hills and up along the slope beyond the maximum flood level. The upper portion and long flat apron will be composed of stones of the largest dimensions that can be handled and arranged, the interstices being filled from behind with small stones, gravel, and earth dumped from suitable trestles.

By this dam, slack-water navigation in the River San Juan will be obtained in the whole distance from the Lake, in which, with the exception of the 28 miles above Toro Rapids, the navigable channel will be at no point less than 1,000 feet wide, with depths varying from 28 to 130 feet. Between the Lake and Toro Rapids rock blasting under water and dredging to an average depth of 4½ feet will be required at several places, amounting in all to 24 miles, most of the rock blasting occurring at Toro. The average depth of water, as raised by the dam, over the shallow places where deepening has been estimated for, is 23 feet, and the excavated channel is 125 feet at the bottom, the slopes varying with the character of the material.

A further important effect of the dam will be to raise the water from the River San Carlos to the level attained by the San Juan at their confluence above Ochoa, converting the valley of that stream into a spacious lake or port; and an integral part of the summit level and of the canal itself. Thousands of square miles of the territory of Costa Rica, now inaccessible by land or water, will thus become the richest portion of that Republic; and the sediment now being brought down by the rapid current of the river will then be deposited, for want of transporting power, at the mouths of the ravines and mountain torrents emptying into the basin. In fact, the area now scoured will be so much reduced that comparatively little material will be transported.

The confining ridge to the east of the valley of the San Carlos is a generally high range, extending in a nearly straight line from the south abutment of the Ochoa Dam, about S. 15° W. 7⅛ miles, to the foot of the high mountains of the interior. The length of the ridge, following its crooked crest-line, is about 10 miles. The hills forming the ridge do not form an unbroken range at all points higher than the level of the water, which is here also maintained at 106 feet above sea level. A number of short depressions will have to be closed by embankments, the tops of which will be at an elevation of 112 feet.

The total number of embankments necessary is twenty-one. Of these eight will be very small, the ridge being now above the water line but below 112 feet. Only two will reach the floor of the valley, having a depth of 48 feet. The remaining eleven have an average depth of 19 feet. The aggregate length of embankments on crest is 5,440 feet; on floor of valley 130 feet.

The embankments proposed will be entirely of clay, 15 feet wide on top, with slope of three to one on both sides.

It is proposed to build a large waste weir in the ridge about 2⅜ miles from the Ochoa Dam. This weir having its crest of 106 feet elevation, will discharge the flood waters of the San Carlos into the San Juan independently of and below the dam.

The valley of Cureño Creek runs directly from the site of the proposed weir to the San Juan, 5½ miles below Ochoa, hence no channel for the discharged waters need be provided.

In the east side of Lake Nicaragua, dredging in soft mud will be needed for a distance of about 14 miles to reach the depth of 30 feet, the average depth of the cut being 9.8 feet, and the proposed channel 150 feet wide at the bottom, with side slopes of three to one to the present bottom of the Lake.

From the end of this cut to within 1,400 feet of the west coast, at the entrance of the canal, the depth in the Lake varies from 30 to 150 feet. The excavation on the west side is estimated as rock. No borings were taken on this side of the Lake, but the indications on the shore and the result of the borings in the vicinity point to rock as predominating in the subaqueous excavation.

In view of the nature of the bottom and the prevailing winds on that coast of the Lake, it is deemed advisable, if not essential, to estimate for two crib piers or breakwaters at the entrance of the canal and extending into deep water a distance of 1,800 feet and 2,400 feet respectively. These piers will have the effect of arresting débris drifting along the coast by the action of the waves, insure smooth water at the entrance of the canal, and serve as guides to approaching vessels.

Western Division.

[From the Lake to Brito, 17.04 miles.]

This section of canal connects the Lake with the Pacific Ocean. It is 17.04 miles long from the shore of the Lake when at 102.5 feet above the sea level, the elevation at the time the surveys were made, to the port at Brito.

As the canal is now estimated for 11.44 miles of that distance will be wholly in excavation and 5.60 miles through a basin in the valleys of the rivers Grande and Tola.

In this basin from 30 to 70 feet of water can be had for a distance of 4.568 miles. The basin has an area of 4,000 acres, an extreme width of 12,500 feet, and an average of 5,500 feet. An alternative route has been located through the valleys proposed to be flooded for a canal in excavation should it be found more economical on account of the value of the land through which it passes. The only new feature of this division is the basin now introduced.

The first section begins at the mouth of the river Lajas, on the west shore of Lake Nicaragua, and follows the valley of that stream for a distance of 8,260 feet, in which the width of the canal is 120 feet at the bottom, and the side slopes one and one-half to one, both in rock and earth. The river Lajas here turns to the south, and it is proposed to divert it and make it discharge into the lake a short distance south of its present mouth. The canal continues on the same straight line, crosses a plain about three-quarters of a mile wide, and enters the valley of the Guiscoyal, a small tributary of the Lajas, and at 4.70 miles from the lake it crosses the highest elevation on the line between the lake and the Pacific. This point is 42 feet above high lake, or 152 feet above mean tide in the Pacific, and is situated in a valley about 2 miles wide, deserving special notice by reason of the fact that it is the lowest depression of the main ridge between the Atlantic and Pacific Oceans on the American continent.

After crossing this divide the line gradually descends at the rate of about 9 feet per mile, and in 1¼ miles farther it meets the Rio Grande, a mountain stream which drains an extensive area of the western slope of the Cordillera. The line of the canal follows the tortuous channel of the Grande, cutting across some of its sharp bends, or occupying a channel in short reaches. In 1½ miles it frees itself from this contracted valley and cuts across a broad plain as it turns to the westward, and enters the basin of the Tola, 9 miles from the lake. The distance across the basin by the sailing line is 5.504 miles. This basin is formed by the construction of an embankment 1,800 feet long and 70 feet high, resting on two high hills at a place called La Flor. The method of construction of this embankment is in all respects similar to that adopted for the construction of the Ochoa Dam and embankments in the San Francisco Valley. The rock for the fill will be obtained from the excavations for Locks Nos. 4 and 5 in the north abutment, and the earth from the canal excavation east of the basin. The level of the lake will be extended through the divide cut and the basin to this dam, the top of which is established at 112 feet above sea level. Therefore, the lake will have to rise more than 2 feet above the proposed summit level before any water runs over the weir. With a length of weir of 1,300 feet and the lock culverts capable of discharging not less than 4,500 cubic feet per second, the level of the lake can be kept under control, even during extraordinary floods. Yet a guard gate is proposed in the section of canal between the lake and the "Divide" to shut off the water from the lake in case of necessity. No special provision has been made for the control of the rivers Grande and Tola, and none is deemed necessary. These streams will flow into the summit level, one between the lake and the Tola basin, and the other at the northern extremity of the basin. The waters will be distributed between the basin and the lake, or partly used for feeding the locks, and should both rivers be in flood while the water in the basin is below the crest of the weir,

and therefore, most of the combined flow discharging into the lake, the current in the canal through its narrowest portion in the "Divide," will not exceed 2 miles an hour, which can do no harm to the rock cut, while in the larger portions of the canal the velocity would, of course, be proportionately less.

From the western end of the valley of Tola to Brito, the canal, after leaving Locks Nos. 4 and 5, cuts across a broad, flat country, with an inclination of about 9 feet per mile, to the port, a distance of 2.28 miles, in which the excavation does not exceed that required for the canal prism.

Three locks are proposed to overcome the difference of level between the summit and the Pacific. Locks Nos. 4 and 5 are located in the hill north of La Flor Dam; their chambers are 650 feet long and 70 feet wide, and the lifts 42½ feet in each. Lock No. 6, of the same dimensions of chamber, is situated 1.58 miles below, its lifts being 21 and 29 feet, respectively, at high and low tide. Between this lock and the port of Brito, a distance of 0.57 miles, the canal will be at the level of the sea, with an enlarged section, and may be regarded as an extension of the harbor, similar to that at the Greytown end of the route.

HARBOR OF GREYTOWN.

Thirty years ago this harbor had a comparatively narrow but safe entrance from the sea, with a deep and commodious inner bay, where the largest class of sea-going vessels could lie with perfect safety. To-day this bay is converted into a fresh-water lagoon, separated from the sea by a continuous sand strip, stretching across the old entrance. This sand bank is the work of the waves, which, striking the sandy coast at an angle varying with the direction of the wind, but always inside of the first quarter, drives the sand from east to west, to be deposited at the extreme western end of the hook, or east side of the entrance. This continuous operation caused the hook to advance until it struck the main coast on the west, thus completely inclosing the bay.

The plan for the restoration of the harbor is based on data gathered through many years of investigations, in which the nature and magnitude of the forces operating on the coast were carefully defined and considered. It became then an easy matter to create the means of opposing these forces, and the following plan has been adopted, and is now in process of execution.

It consists in the construction of a jetty, or breakwater, about 2,000 feet long, nearly normal to the shore of the sand strip separating the bay from the sea, and extending to the 6-fathom curve; then dredging from this latter depth offshore across the sand bank and in the inner bay.

The jetty is located to the windward of the proposed entrance channel, which it is intended to shelter from the sea and protect from the wash of the waves and the traveling sand of the coast. The shifting sand arrested by the pier will accumulate in the angle formed by the pier and coast until the deposit reaches the end of the breakwater, when there will be a tendency to shoal around the outer end and across the entrance. This can be again prevented by an extension of the pier, and the same process continued from time to time until the new coast line thus formed is perpendicular to the prevailing direction of the wind, when the shifting action of sea will be permanently arrested and the work of the waves will be confined to piling the sand on the beach.

The first section of the jetty extending from the shore to 15 feet of the water, is proposed to be built of creosoted timber, fascinage, and stone, and that portion in deep water to be of "pierre perdue" or rubble, the stone to be obtained from the "Divide Cut." The entrance channel is estimated to have a depth of 30 feet and a width of 500 feet at the bottom, and the inner basin is designed of sufficient dimensions to afford easy access to the canal and to accommodate a large number of vessels, its excavated area on the bottom being 206 acres, which, with the area of the enlarged section of the canal at sea level to Lock No. 1, gives a total area of 341 acres of water 28 feet deep, exclusive of slopes of three to one and the remaining portions of the inner bay not deepened, yet having in many places a depth of 20 feet, in which a large number of vessels of ordinary size can lie.

The first 700 feet of the pier have already been successfully built, and the results so far obtained fully confirm the expectations to be realized by the execution of the plan.

BRITO.

The recent surveys have greatly added to previous information as to the natural conditions of this locality, which, by reason of its being of necessity the terminus of the canal on the Pacific coast, has been spoken of as "the harbor," when, as remarked by Professor Mitchell, it is not even a roadstead. Yet the practicability of constructing a harbor at this point has not been disputed, the only difference of

opinion being confined to details. The plan now proposed combines, as nearly as possible, the most economical form of construction with that best adapted to the physical conditions, and meets, it is believed, most effectually the objections raised against former designs.

The broad valley of the Rio Grande stretches to the coast at this point through a wide gap in the main range of hills extending along the Pacific coast. This valley, it is believed, formed once a considerable bay, but is now filled up for a distance of about 6,000 feet from the beach to about the level of high water. The proposed plan for the construction of the harbor consists, (1) in a breakwater 900 feet long, extending from a rocky promontory projecting from the beach at the western extremity of the range of hills, and, (2) another jetty, 830 feet long, normal to the beach nearly opposite the extremity of the one before mentioned. The proposed harbor will be partly in deep water confined by the jetties, but its main portion is proposed to be excavated in the alluvial valley, the whole forming a deep and broad basin penetrating 3,000 feet from the present shore line at high water and 3,900 feet from the entrance between the jetties. As an entension of the harbor, the canal itself is excavated at sea level with an enlarged prism for a distance of 3,000 feet farther inland where the tide lock has been located. It is believed that, with the basin as designed and the prolongation of the sea level through the canal, sufficient tranquility will be secured at the lock and in the harbor, but should this prove not to be the case, an enlargement of the main basin by dredging in soft material would be a question of but comparatively small expense.

The breakwaters, as estimated for, are of "pierre perdue," the material to be obtained from the rocky promontory or from the western "Divide Cut," the price allowed being on the latter basis. The harbor has an area of 95⅛ acres on the bottom or excavated portion, and with the sea level section of the canal the total area is 103⅜ acres of water, 30 feet deep, exclusive of the slopes of three to one.

MATERIALS FOR CONSTRUCTION.

The whole line of the canal is well supplied with timber, generally of excellent quality, though in some sections of the eastern division it has been deemed advisable to estimate for its use only on temporary works during construction, such as trestles, laborers' dwellings, etc., the sheet piling and most of the bearing piles being imported from the Southern States and creosoted when necessary. On the western division, however, the wood growing on ground less moist is of a very superior quality, and it is proposed to use it for all purposes, its durability having been amply proved in every class of construction throughout the country.

The rock proposed to be used for the dams, weirs, and breakwaters will be got from the divide cuts, which consist chiefly of basalt and various descriptions of trap of excellent quality for the purpose.

Lime of the best quality is obtainable in the western division at many places, and the numerous specimens of work on which it has been used have stood the test of many generations and are to-day in a state of perfect preservation, but it is calculated to supplement this supply with imported cement, which will be used largely in the form of concrete in the construction of locks, etc., clean sharp sand being found in abundance in the beds of most of the streams in the vicinity of the canal.

DIMENSIONS AND CAPACITY OF THE CANAL.

In establishing the dimensions of the canal it has been my purpose to profit by the experience at Suez, where a yearly traffic of 6,000,000 tons could not be carried through without serious delays to navigation. The reduction in the length of excavated canal accomplished by the last location in Nicaragua, through the substitution of free navigation in deep and broad basins for a restricted channel, gives additional facilities for the construction of a waterway capable of accommodating not less than 12,000 vessels, with a net tonnage of 20,000,000 a year, at but a small increased cost as compared with the advantages secured, both for the commerce of the world and the economical administration of the enterprise. In fact, the immediate and prospective benefits obtained by the enlargement, in the increased facilities for passing vessels, and a considerable decrease in the cost of maintenance and preservation of the work, fully justify, it is believed, the additional expense in the original cost. It will be seen on examination of the subjoined table that, of the 169.448 miles, the total length of the canal from the Atlantic to the Pacific, 121.04 miles is unimpeded navigation in the river San Juan and in Lake Nicaragua, and 21.619 miles through basins, making a total distance of 142.659 miles in which ships can travel with little or no restriction as to speed. Of the remaining 26.789 miles, 0.759 is taken up by the six locks, leaving but 26.030 miles of canal actually in excavation. Of this latter distance 18.189 miles are of canal large enough for vessels traveling in opposite direc-

tions to pass each other, the sectional area being in excess of the largest area of the Suez Canal. The two sections of canal with contracted prisms are in the eastern and western divide cuts; the first is 2.917 miles and the other 4.924 miles in length, and located as they are almost at the extreme ends of the summit level and in close proximity to the upper locks, it is believed that the slight additional facilities to navigation secured by enlarging the dimensions of the canal in these heavy rock cuts and the inconsiderable gain in the time of transit would not compensate for the larger outlay necessary.

Table showing the dimensions of the several sections of the proposed canal.

Section of canal.	Length.	Width.		Mean depth.	Area of prism.
		Top.	Bottom.		
	Miles.	*Feet.*	*Feet.*	*Feet.*	*Sq. feet.*
Greytown to Lock No. 1	9.297	288	120	28	5,712
Lock No. 1 to Lock No. 2, canal	1.258	210	120	30	4,950
Lock No. 2 to Lock No. 3, canal	1.650	210	120	30	4,950
Lock No. 2 to Lock No. 3, basin	1.762	.....	.....	30	.....
Lock No. 3 to western end of eastern divide cut, canal	2.917	80	80	30	2,400
Lock No. 3 to western end of eastern divide cut, Deseado Basin	3.086	.....	.....	45	.....
Western end of divide cut to Ochoa, canal	1.233	184	80	30	3,673
Western end of divide cut to Ochoa, San Francisco Basin	11.267	.....	.....	40	.....
River San Juan to Toro Rapids	37.040	.....	.....	52	.....
River San Juan, where dredging is needed	27.500	.....	125	28	.....
Lake Nicaragua	56.500	.....	150	50	.....
Lake to western divide cut, canal	1.565	210	120	30	4,950
Western divide cut, canal	4.924	80	80	30	2,400
Divide cut to east end of Tola Basin, canal	2.519	184	80	30	3,673
East end of Tola Basin to Lock No. 4, basin	5.504	.....	.....	50	.....
Lock No, 5 to Lock No. 6, canal	1.582	184	80	35	3,673
Lock No. 6 to harbor of Brito, canal	.570	288	120	28	5,612

RECAPITULATION.

	Miles.
Canal excavation, east side	14.870
Canal excavation, west side	11.160
Six locks, both sides	.759
Canal in excavation	26.789
Deseado Basins	4.848
San Francisco Basin	11.267
Tola Basin	5.504
Length of basins	21.619
River San Juan	64.540
Lake Nicaragua	56.500
Natural waterways	121.040
From Atlantic to Pacific (length of canal)	169.448

In the lake and in the greater part of the River San Juan vessels can travel with unrestricted speed, and in some sections of the river and in the basins, although the channel is at almost all points deep and of considerable width, yet the speed will be somewhat checked by reason of the curves.

Official reports show that, in the Suez Canal, steamers of 4,400 tons can travel at an average speed of 6 statute miles per hour, and that smaller vessels travel through the canal at the rate of from 6 to 8 miles an hour. On this basis the following estimate of the time of transit has been prepared:

Estimated time of through transit by steamer.

	H.	M.
26.030 miles of canal, at 5 miles an hour	5	12
21.619 miles in the basins, at 7 miles an hour	3	05
64.540 miles in River San Juan, at 8 miles an hour	8	04
56.500 miles in Lake Nicaragua, at 10 miles an hour	5	39
6 lockages, at 45 minutes each	4	30
Allow for detentions in narrow cuts	1	30
Total time of transit	28	00

The traffic of the canal will be limited by the time required for a vessel to pass a lock and on a basis of 45 minutes and that but one vessel will pass in each lockage, the number of vessels that can pass through the canal in one day will be 32, or in one year 11,680, which, at the average tonnage of vessels going through the Suez Canal, will give 20,440,000 tons per year. This estimate is on the assumption that the traffic will not be stopped during the night, for, with abundant water power at the locks and at the basins the whole canal can be economically illuminated by electricity, and, with beacons and range lights in the lake and river, there seems to be no good reason why vessels should not travel day and night with perfect safety, and the outlay necessary for the illumination has consequently been included in the estimate.

WATER SUPPLY.

Lake Nicaragua has a surface area of about 2,600 square miles and a watershed of not less than 8,000 square miles. Gauges at its outlet, the River San Juan, at its lowest stage between the Lake and Toro Rapids, showed a minimum flow of 11,390 cubic feet per second. Colonel Childs estimated the discharge with full lake in the wet season at 18,059 cubic feet per second, which gives a mean flow of 14,724 cubic feet per second, or 1,272,530,600 cubic feet per day.

Water required for lockage.

	Cubic feet.
Water required for one lockage:	
On the east side	2,047,500
On the west side	1,933,750
On both sides	3,981,250
Water required for thirty-two lockages per day	127,400,000

This gives a daily excess for the lake supply *only* of 1,144,753,600 cubic feet.

To the latter amount must be added the flow of the several tributaries of the San Juan River between the lake and the Ochoa Dam, and also the tributaries of the basins forming part of the summit level, which would fully compensate for leakage and evaporation.

It is expected that considerable leakage will take place at the rock-fill dams and embankments before they consolidate and become tight, but this may well be accepted as a desirable condition to aid in gradually disposing of the surplus water without a large discharge over the weirs.

The above statement shows that the lake discharge is about ten times larger than the maximum amount needed for the canal, and it may be safely estimated that for many years after the canal is opened for traffic, the surplus, from that source alone, will be double that amount, while at the confluence of the rivers San Juan and San Carlos, above the Ochoa Dam, the excess may even reach forty times the quantity needed for the canal. It is evident, therefore, that as long as the summit level can be maintained at the required elevation, the leakage through the rock-fills, acting as safety valves, may be regarded as an element of security rather than one of danger, especially as the tightening of the dam may be regulated by depositing suitable material on the upstream side, or by dumping more stone on the lower slopes or on the crest, so as to preserve the desired elevation of the surface of the water.

A detailed estimate of the cost of the canal is foreign to the nature of this paper, but it may be proper to state that the probable total cost has been arrived at through careful computations based upon the data obtained by the last location and numerous boring along the whole route.

The eastern divide cut, less than 3 miles in length, is represented in the estimate with 7,000,230 cubic yards of rock in place, and 22 per cent. of the cost of the whole canal. Reference has already been made, in describing the Eastern Division, to the existing facilities for doing the work and the several purposes to which the material to be removed can be economically applied in the construction of the canal. In the Western Division the excavation in rock through the divide cut is estimated at 5,696,507 cubic yards, distributed over a distance of 9 miles, in which the deepest portion of the excavation is but 42 feet above the surface of the water. There are ample facilities for the deposit of the waste material not needed for the construction of the breakwaters, the locks, the embankments, the dam, etc.

Of the 26.789 miles of canal in excavation, more than 12 miles will be done by dredging at the level of the sea, the material to be deposited directly on both sides of the canal prism.

A railroad has been estimated for between Greytown harbor and the river San Juan above the Ochoa Dam, and on the Western Division between the lake and the Pacific, which, together with the lake and river and the smaller streams penetrating the valleys of the Deseado and San Francisco, will afford easy and economical communication along the whole route.

It is admitted that the cost of this work will be greater than that of similar work

located in a well-developed country. A large percentage of the increased cost is chargeable to the transportation of machine tools, and to the difficulty of obtaining and providing for the workmen, the country from Greytown to the lake being uninhabited and covered with a dense forest, and intercepted by extensive swamps and ridges of steep hills; and that between the lake and the Pacific but sparsely populated. The erection of houses for the protection of property and the accommodation of employés will also be a necessary item of considerable expense, but the country is exceptionally healthy, and these structures need not be either substantial in character or expensive. They need be, as a rule, but temporary sheds built with material gathered along the line of the canal, at but little more cost than the labor of handling it. Yet much delay and expense will be found unavoidable in the preliminary preparations for commencing the work of excavation.

Another contingency which may cause a marked increase in the cost of the work is the physical inability of the imported workmen to perform the ordinary labor, as compared with that accomplished in a more temperate climate. The laboring classes of Nicaragua, when under proper control, are capable of an activity and endurance under great fatigue and exposure to the elements scarcely equalled in any other country, and with no apparent injury to health; yet the same capabilities can not be expected in unacclimated foreigners accustomed to different conditions of life. It is believed that not less than 6,000 excellent laborers can be obtained from the Central American States, and that with a judicious management all the help needed can be had from the Gulf States in this country where the climatic conditions are in many respects similar to those prevailing over a large portion of the canal route. The number of skilled laborers employed will be comparatively small. On the west side of the lake, where the greater number of laborers will be employed, the climate is not excelled for salubrity by any other portion of Central America, and in that portion of the eastern section from Ochoa to Greytown, which is the only locality where trouble from climatic causes might be expected, the unexceptional good health enjoyed by the employés of the company during more than two years of constant exposure to the influence of the climate, while undergoing all kinds of hardships and privations, seems to be an evident demonstration that no apprehension need be entertained as to the climate. It will be observed that in this section the work is divided into two large classes, viz: the divide cut and dredging. The first is located in the most elevated and healthy portion of the line, and in the second the number of employés is reduced to a minimum, as manual labor is almost entirely excluded. The small force necessary to handle and care for the machinery will be either housed on the dredges or in quarters in the divide where, with the purest of waters from the mountain streams and the cool trades constantly sweeping in from the sea, the slightest sanitary regulations will insure perfect health at all times.

It is believed that with an intelligent and businesslike management the canal can be completed in six years for the work of actual construction, and one year in making the necessary preparations to commence active operations, and that the total cost will not exceed $90,000,000, exclusive of banking commissions, interest during construction, and other expenses not included in the engineer's estimate.

WORK ACCOMPLISHED.

The first expedition for construction left New York on the 25th of May, 1889, and on the 3d of June landed at the proposed entrance to the canal, near Greytown, on a sandy, uninhabited coast, without harbor or shelter from the elements, with no means of communication along the line of the canal except through tortuous and much-obstructed streams, some of which could not float a loaded canoe, and depending altogether on a base of supplies for construction materials and subsistence 2,000 miles distant, with only one line of steamers touching on that coast, and two weeks distant from the nearest telegraph station. The first work of the pioneers of the great enterprise was, necessarily, one of self preservation. Rude temporary shelters had to be improvised for the protection of men and stores, while more permanent buildings could be erected; means of transportation along the route of the canal through deep and extensive swamps and virgin forests had to be provided for, and telegraphic communication to the nearest station (more than 100 miles from the coast) and connecting the various camps about to be established with the base of operations, was felt from the start to be a necessary adjunct to prosecuting the work. Under these conditions, aggravated by an insufficient supply of an inferior class of labor, the first operations were difficult, tedious, and expensive, and it was not until the month of October following that the preliminary organization of the various departments had been completed, and the ordinary work of construction could be said to have commenced.

The opening of an entrance into what used to be the Bay of Greytown, was recognized from the start to be an indispensable requisite in the prosecution of the work. Ships now anchor about 2 miles off shore, and machinery and other supplies are

brought ashore in lighters, through a shifting entrance and dangerous bar, with a variable depth, never exceeding 6 feet. This method of landing supplies involves considerable risk and expense, and is altogether inadequate for the discharge of the heavy machinery. The company, therefore, has spared no effort in obtaining an entrance from the sea into the bay, and the construction of the breakwater was one of the first works undertaken by the company, and pushed ahead with all possible dispatch. This pier is now about 700 feet long, its outer end being in 12 feet of water, and so far has fulfilled, even beyond expectations, all that was expected to be accomplished by it. It affords already sufficient protection to the dredges excavating the channel, and the company has already made a contract for the dredging of the entrance and inner bay to a depth of 20 feet. Some of the dredges are now in Nicaragua and others are in process of construction and will leave soon for Greytown. It is expected, therefore, that within the next five months vessels drawing 15 or 20 feet may be able to enter the bay and discharge their freight directly on the wharves of the company.

Heavy machinery suitable for the work can then be safely landed, the work of preparation may be said to have been completed, and active operations can be undertaken along the whole route.

While prosecuting the harbor work the company has also established permanent quarters, erected large storehouses, hospitals, dwellings, shops, and other buildings. It has accumulated the necessary material for the construction of an aqueduct 13 miles in length (work on which is now actively pushed), which is to supply Greytown, the works on the eastern section of the canal, the harbor, and the company's headquarters, with fresh water from the mountains. It has erected wharves and warehouses for the receipt and storage of supplies. Parts of the San Juanillo, Deseado, San Francisco, and other streams, have been cleared of obstructions and made navigable for small craft, and several miles of the route of the canal, between the harbor and the Eastern Divide, have been grubbed and cleared and made ready for dredging. The company has built about 10 miles of broad gauge railroad and about 70 miles of telegraph and telephone lines, and has landed at Greytown large quantities of machinery, tools, lumber, piles, creosoted timber, boats, steam tugs and launches, lighters, pile drivers, and other materials and equipment necessary for the harbor and canal work. Large quantities of railroad supplies, locomotives, steam excavators, are now at Greytown, and a contract has been let for the construction of 17 miles of railroad from Greytown to the Eastern Divide cut, work on which has already commenced, and, in short, it may be safely said that the whole work is being pushed forward as rapidly as the circumstances and condition of the country permit.

A. G. MENOCAL,
Chief Engineer.

APPENDIX B.

SPECIAL REPORT ON DATA RELATING TO THE MARITIME CANAL OF NICARAGUA AND THE REGIONS TRIBUTARY THERETO.

[By CHARLES T. HARVEY, *Civil Engineer.*]

THE MARITIME CANAL COMPANY OF NICARAGUA,
Secretary's Office, 44 *Wall Street, December* 30, 1889.

The undersigned has been instructed to cause the following correspondence and report to be printed for the general information of the friends and stockholders of the above-named enterprise.

Special attention is called to the fact that the locks of the Lake Superior Ship Canal (of which the dimensions most nearly coincide with those proposed for the Nicaragua Canal,) have been in constant use for one-third of a century without cessation for a single day from accidents or for repairs during seasons of navigation.

This precedent is deemed by the company a sufficient indication that like results are certain in this enterprise, where the latest-improved lock appliances and safeguards will be provided from the outset, and where more favorable climatic conditions exist.

The fact that the Lake Superior Canal was built within the estimates of both time and cost, under less favorable conditions in many respects than attach to the construction work of this company, will doubtless have weight in the minds of those who in such matters are influenced by precedents.

The statistics of the growth and relative economy of the water way traffic of the section of this continent tributary to the Lake Superior Ship Lock Canal, are deemed worthy of especial attention.

The conclusions set forth in Mr. Harvey's report, illustrated by the accompanying maps, relating to the territory on this continent, from which commerce will seek the Nicaragua Canal as the most economical route, suggest new commercial conditions and results, deemed especially interesting to those having, or contemplating, investments in connection with this interoceanic and international water way.

THOMAS B. ATKINS,
Secretary Maritime Canal Company of Nicaragua.

THE MARITIME CANAL COMPANY OF NICARAGUA,
President's Office, 44 *Wall Street, New York, May* 15, 1889.

DEAR SIR: The fact that you occupied the positions of both business manager and constructing engineer of the greatest ship canal operated with locks at the time of its completion, and which has held the first place as to tonnage traffic up to the present time (outranking the Suez Tide-Level Canal in monthly volume of business during open season on the Western Lakes), and that you were honored with a vote of thanks by the Constructing C ompany for your ability displayed in prosecuting the canal work under your charge to completion, led the Nicaragua Canal Construction Company to select you as a member of the advisory board of engineers, which has lately concluded its revision of the estimates of Chief Engineer Menocal, as based upon the surveys made and data ascertained by the engineering corps under his directions.

Considering your former experience a valuable guide in such undertakings, and that your recent inspection of the maps, profiles, plans, and general data of this enterprise will enable you to state the main points connected with its feasibility and future traffic development in the light of established precedents coming under your personal observation, and in a manner which will no doubt prove worthy of special

attention, I request you to favor me with your views and suggestions from the standpoint of a constructor of ship-lock canal work and manager of such water-way interests.

Yours, very respectfully,

HIRAM HITCHCOCK,
President Maritime Canal Company.

CHAS. T. HARVEY, ESQ.,
Civil Engineer, New York City.

NEW YORK CITY, *May* 20, 1889.

DEAR SIR: Your communication of the 15th instant has been received and duly considered. Prior engagements for the ensuing season will prevent my giving immediate attention to the subject to which you refer, but when otherwise disengaged I will endeavor to comply with your wishes.

I am at present planning to visit, during the coming summer, the ship canal at the outlet of Lake Superior, the subject of my former labors, and if that plan is realized, I will allot a portion of my time while there to formulating a statement of facts, past and present, connected with that water way, with a view to its bearing upon the results to be anticipated at the completion of the Nicaragua Ship Canal.

The extended examination of the construction data of the noble enterprise which you represent, made by me early in the present year, has led to the formation of opinions which, with due allowance for time necessarily occupied by other and prior professional engagements, can be placed at your service after my return to the city. Meanwhile you may not hear from me again until I reach the outlet of that matchless inland sea and the adjacent region where I was a pioneer in promoting the development of its then latent, but now famous, commercial resources.

I remain, very respectfully, yours,

CHARLES T. HARVEY.

HIRAM HITCHCOCK, Esq.,
President Maritime Canal Company.

INTERNATIONAL HOTEL,
Sault Ste. Marie, Ont., August 20, 1889.

DEAR SIR: Referring to my letter to you of May 20, 1889, I have now to say that circumstances have favored the plan I then entertained of revisiting this locality.

If any persons have the impression that ship canals have been superseded in commercial importance by the march of modern improvements in other forms of transit, a visit of inspection to this point (where is located the greatest development of lock canals to be found in the world) will quickly dispel such an illusion. From the windows of the hotel where these lines are written my eyes can rest upon enlargements of canal capacity, now being prosecuted upon both banks of the Falls of the St. Mary's River, the outlet of this greatest of inland seas, by two of the most enterprising nations of the world. The workmen employed in these respective operations are under separate nationalities, although less than one mile apart. And yet, with only the present facilities, more tonnage is being locked through the operating canal on the southern side of the river in seven months (navigation in this region being closed by ice, on the average, from December 1 to May 1 in each year), than is expected to pass through the Suez Canal during the present calendar year. I have myself seen, during one morning of this week, 15 steamers (some of 3,000 tons burden), clustered together as passed, passing, or waiting to pass the locks; and within the space of one hour all had disappeared upon their respective voyages.

The annexed view is from a photograph recently taken of a fleet of steam and sail vessels (the latter mostly masted barges, regularly towed between ports by consort steamers) awaiting their turn to pass through the lock of the United States Ship Canal at the entrance to Lake Superior.

Comparing this with the time when, in 1853, I wheeled out the first barrowload of excavation for the original ship canal at this point, the change seems almost incredible. Then a tram railway operated by a few horses sufficed to transfer around the falls all commodities to and from Lake Superior.

This, to my mind, is but an appropriate indication of the growth of the commerce which waits upon the opening of the Nicaragua interoceanic water way to crowd its utmost capacity.

Thus far, by way of introduction, to a report [part first] upon the data respecting water-way developments in this region, the preparation of which I have already commenced.

Very respectfully, yours,

CHARLES T. HARVEY.

HIRAM HITCHCOCK, Esq.,
President Maritime Canal Company, 44 Wall St., New York City.

PART FIRST.

DATA RELATING TO THE SHIP-CANAL FACILITIES AND TRAFFIC OF THE LAKE SUPERIOR BASIN.

HISTORICAL.

In the last decade of the eighteenth century, a British fur-trading company constructed, on the Canadian side, a sluiceway for the passage of loaded bateaux around the Falls of the St. Mary's River, by a gradual incline to a lift-lock, about 40 x 9 feet in area, built of dressed timber, of which remains have recently been exhumed. Records are silent as to its further history, but it is believed to have been destroyed during the war of 1812–'14, when a military force from the United States burn every building in that vicinity.

In 1852 the Congress of the United States passed a law donating to the State of Michigan 750,000 acres of public land within its borders, to aid in building a ship canal around the Falls, committing the entire control of the work to the State, stipulating, however, that the canal should not be less than 100 feet in width, and 12 feet deep, with locks not less than 250 feet long and 50 feet wide.

Being myself at the Falls when this law was enacted, my own conviction of the importance of the work led me to immediately devote my time and energies to its promotion. In the line of this effort I attended the next session of the State legislature, and was selected by the committee having the matter in charge to draught the State law to govern the prosecution of the enterprise, and it was enacted substantially in the form in which I submitted it. Having made a tour of the lake region during the previous year, its latent resources so impressed me that, upon later attendance at the legislature, I strenuously advocated building the canal upon a still larger scale than the act of Congress called for, as sure to be needed in the coming years. Although the only person, so far as my memory recalls, who originally proposed an increase of the lock dimensions, my views were, after considerable hesitation, adopted by the legislators, and locks 350 feet long and 70 feet wide were (in the law) made obligatory by the State as a condition in any contract for the work.

Afterward, submitting a bid in behalf of Eastern capitalists, the contract was awarded to them, and I was at once appointed State's agent by the governor to designate the lands to be received in payment from the United States. In consideration of such selections as made by myself in the Upper Peninsula, and later by a co-land agent for the Lower Peninsula, my principals proposed to build the canal for the State, and upon the wise selection of the aforesaid lands their profits depended.

My next step was to apply to the legislature of New York for a special charter for a construction company, which the constitution of the State of Michigan did not permit, but which its legislature could (and did) recognize when created by another State. Having obtained the charter at Albany, New York City was next visited, where cash subscriptions were secured for the authorized capital stock of $1,000,000, and the same apportioned to capitalists, who constituted a remarkably influential and financially able body of stockholders.

Upon the organization of the corporation as the St. Mary's Falls Ship Canal Company I was appointed its general agent, with full executive powers for prosecuting the work, and proceeding to Detroit organized the first detachment of the working force, numbering about 400 men, chartered a steamer, and landed them at the "Soo" (the name under which the Falls, in abbreviation of the French name given it by the Jesuit pioneers of the seventeenth century, were known), June 2, 1853. On the 4th of the same month I formally broke ground, and the work commenced forthwith.

My supervisory duties included, unexpectedly to me, that of chief engineer, with the sole responsibility of directing the work, in all respects, during the closed or winter seasons. The most remarkable operation occurring in the engineering department during that period was the devising and constructing of a machine, operated by steam, which could deliver a blow of 10,000 pounds force per square inch, by which submarine rock excavation was carried on in midwinter in 2 fathoms of water, including nearly a half-fathom of ice.

When the emergency requiring such force was discovered, I was obliged to dispatch couriers over the icy wastes of frozen rivers and lakes to the Canadian settlements along the north shore of Georgian Bay to collect numbers of blacksmiths' bellows sufficient to furnish the blast for forging the main parts of this novel machine.

It proved a great success, and by it thousands of yards in area of solid rock were excavated rapidly and economically. While it was operating at the lake entrance I had the honor of personally opening the cofferdam sluice gates, which let the waters of Lake Superior flow permanently into the finished prism and locks of the ship canal *the 19th of April*, 1855.

The time between the commencement and completion of the work was twenty-two and one-half months, whereas the contract period allowed was twenty-four months. The capital allotted for the work was $1,000,000; but my account as construction agent was, in round numbers, less than $875,000. *Thus this canal was, both as to time and cost, completed within the original estimates.*

Probably no public work was ever constructed upon more honorable principles. In every case where, as engineer, I applied to the directors for permission to improve the work beyond the contract specifications, it was granted. The State engineer's plans were originally for lock-gates, worked with long beams, against which men were to brace their backs in opening or shutting. Before that detail was reached more excellent but costlier devices were substituted at the contractors' expense.

This canal had by far the largest locks then to be found in the world, and they have fulfilled their mission without defect or cessation for over a third of a century. Upon an examination made this week I could not find a single fissure in the lock walls or detect any deflection in them, nor in the miter sills or lock-chamber floors. That they would continue thus for ages, so far as the forces of nature are concerned, is unquestionable. The engineers of the United States Government have, however, now commenced operations to remove them, and to substitute a new lock of nearly quadruple capacity, as will be hereinafter noted.

In referring to them, General Poe, U. S. Army, in charge of the work, in his report of of December 29, 1886, uses the following language:

"They were magnificent constructions in their day, and would still be useful if the commerce had not entirely outgrown them."

It may be of interest to you to be assured that if the construction of the canal, of which you have charge, was under its present conditions the subject of choice for personal management, as against the canal at this point, with the surroundings under which its construction was undertaken, I should recommend yours as involving the least risk and administrative energy, to secure its completion within your engineering estimates as to both time and cost.

To meet any incredulity as to such conclusions, in view of the far greater operations required at Nicaragua, some of the obstacles overcome will, by way of contrast, be recalled.

This region was then more remote from the sources of labor supply and many prime materials than is yours at this time.

Thus in 1853 every one of the many thousand kegs of powder used was transported here from the States of Connecticut or Delaware on the Atlantic coast. Agents were required, en route to and from New York City, to hire immigrants and bring them here in gangs, paying all their expenses, and also to circumvent the emissaries of the various railroads then building in Illinois and Wisconsin, who came here surreptitiously to hire them to go elsewhere, as there was at that time a scarcity of labor throughout the West. The nearest machine shop was several hundred miles away, with no practical means of communication during five-twelfths of the year. The nearest telegraph station was at Detroit, 450 miles distant, and business letters in midwinter required six weeks to reach the Construction Company's New York office and return a reply.

On the other hand, all parts of your work will be in telegraphic communication with each other and with your New York office, while labor and supplies can be sent from the best markets directly and cheaply to your own landings and depots.

The conditions as to improvements in labor-saving machinery and explosives made available within the intervening years are almost incomparably in your favor.

In this case drilling was done mainly by hand—100 men then not equalling the work of ten men with present improved machinery. Then the only way to hasten the work was to increase the number of hands, and consequently at one time 2,000 men could here be seen at work within the space of 1 mile. The climate and sanitary conditions of your line of work must be considered as exceptionably favorable, in view of the equable mildness of the climate and for other reasons hereinafter stated under the caption of "climatic conditions," etc.

At this locality, during the severity of winter, 35 degrees below zero is frequently registered in the mornings of the short days, with only eight hours of sunlight

During the hours of such extremely low temperature one man was detailed to stand at the head of each of the runways for barrows, with orders when he saw a face frost-bitten to rub it with snow until circulation was restored without the barrow-man leaving the work. Epidemic cholera broke out during the second summer and carried to their graves about one-tenth of the working force.

When these facts are borne in mind it will be seen that a choice of your undertaking as the least difficult will not seem unreasonable. Experts have declared that the record of building a work of the dimensions and importance of the Lake Superior Ship Canal in the face of the obstacles indicated, and yet within the estimates as to both time and cost, has never been surpassed. Be that as it may, it is a pleasant conclusion of this historical notice to be able to say that, viewed as a financial venture, the canal proved a great success for its contractors, as the following instance will illustrate: An English capitalist, residing or having business connections in the Madeira Islands at that time, visited the works with introductory letters to myself, and, after personal observation, instructed his agent in New York to invest $100,000 in the Construction Company's stock. About twenty years later that agent's cashier informed me that he had remitted over $500,000 in sterling exchange as the proceeds of the sale of a part of that investor's quota of the selected lands, with a balance yet to follow.

The locks and canal as originally constructed continued uninterruptedly in use until the close of the season of 1886. Meanwhile the commerce of Lake Superior, in consequence of these canal facilities, increased so rapidly that the demand for enlargements was imperative—not alone from the State of Michigan, which controlled it, but also from such of the other States and the provinces of Canada as bordered upon its connecting lakes. Consequently the State of Michigan, on the 3d of March, 1881, passed an act transferring the canal to the United States Government, which by an act of Congress of the same year accepted it as a national canal—the most important public work within its broad domain. On the 1st of September of the aforesaid year the supplementary lock (for which Congress had made due appropriation) was added to the canal facilities.

Thus far in historical review.

It was my good fortune to meet here during the present month, General Casey, Chief of United States Engineers, having charge of all the national public works, also General Poe, U. S. Army, in charge of Government works in this district, together with Mr. E. S. Wheeler, civil engineer, United States, general superintendent of the canal.

By the courtesy of these distinguished officials, the opportunity was provided for an inspection by me of the governmental work of deepening the river about 20 miles below the canal, at a point known as the Middle Neebish Channel.

CHANNEL IMPROVEMENTS IN THE ST. MARY'S RIVER.

General Superintendent Wheeler accompanied me on the United States *steamer Despatch* on the 12th instant and afforded me all possible information concerning the Neebish Channel rock-excavating operations. A channel is there being cut through solid sandstone rock, from 10 to 15 feet thick, 300 feet in width, for a distance of over 2 miles.

Dredges were made capable of forcing their way through the less solid upper strata of the rock, but the use of explosives in all the strata was found to be cheaper. The chief interest centered upon a machine drill boat, having four steam drills working from one of its sides, boring 2½-inch-diameter holes about 6 feet apart, and 12 to 15 feet deep, into which 30-inch-long dynamite canisters were placed and exploded by electricity, without delaying the other drills at work alongside.

The perfection to which work of that kind has been brought is shown by the fact that the constructors now receive but $1.80 per cubic yard for the rock excavation, measured in place, although required to deposit the débris in a way to construct a sea wall or mole some 6 feet above water, 50 feet from and parallel to the ship channel, as a safeguard against transverse currents acting upon passing vessels. Superintendent Wheeler informed me that the same work, if let ten or twelve years ago, would have cost at least $4 per yard.

These and similar items of information have a direct bearing upon the plans and operations of your company, in prosecuting the deepening of the ship channel at its entrance into Lake Nicaragua and at various points along the San Juan River.

LOCK ENLARGEMENTS AND IMPROVEMENTS.

At the time of the completion of the original canal at this locality no vessels drawing over 8 feet of water could reach it from Lake Huron, owing to reefs and sand bars in the connecting river channels. Then the depth of 12 feet in the locks seemed ample. Not long after this was assured, the National Government entered upon the work of deepening and straightening the lake water courses to a minimum of 12 feet.

A decade later, the channel depth was generally increased to 16 feet, and the same is now being still further deepened to a minimum of 20 feet, under the supervision of Army officers detailed to that duty at the various points of operation.

Coincident with the attainment of the general canal depth of 16 feet, it became necessary to provide similar depth in the canal and locks, and accordingly a supplementary lock was built by the side of the original ones, the lift being made in a single chamber, as shown in the annexed photographic view recently obtained.

This is now the operating lock of the canal, being 515 feet long, 80 feet wide, decreased to 60 feet in width at the gates.

It has a depth of 17 feet over the miter sills, and a lift of 18 feet. The depth of the chamber is 39½ feet. At each end of the lock are placed outside guard gates of the same style as those in regular use, all being of the usual horizontal motion plan-

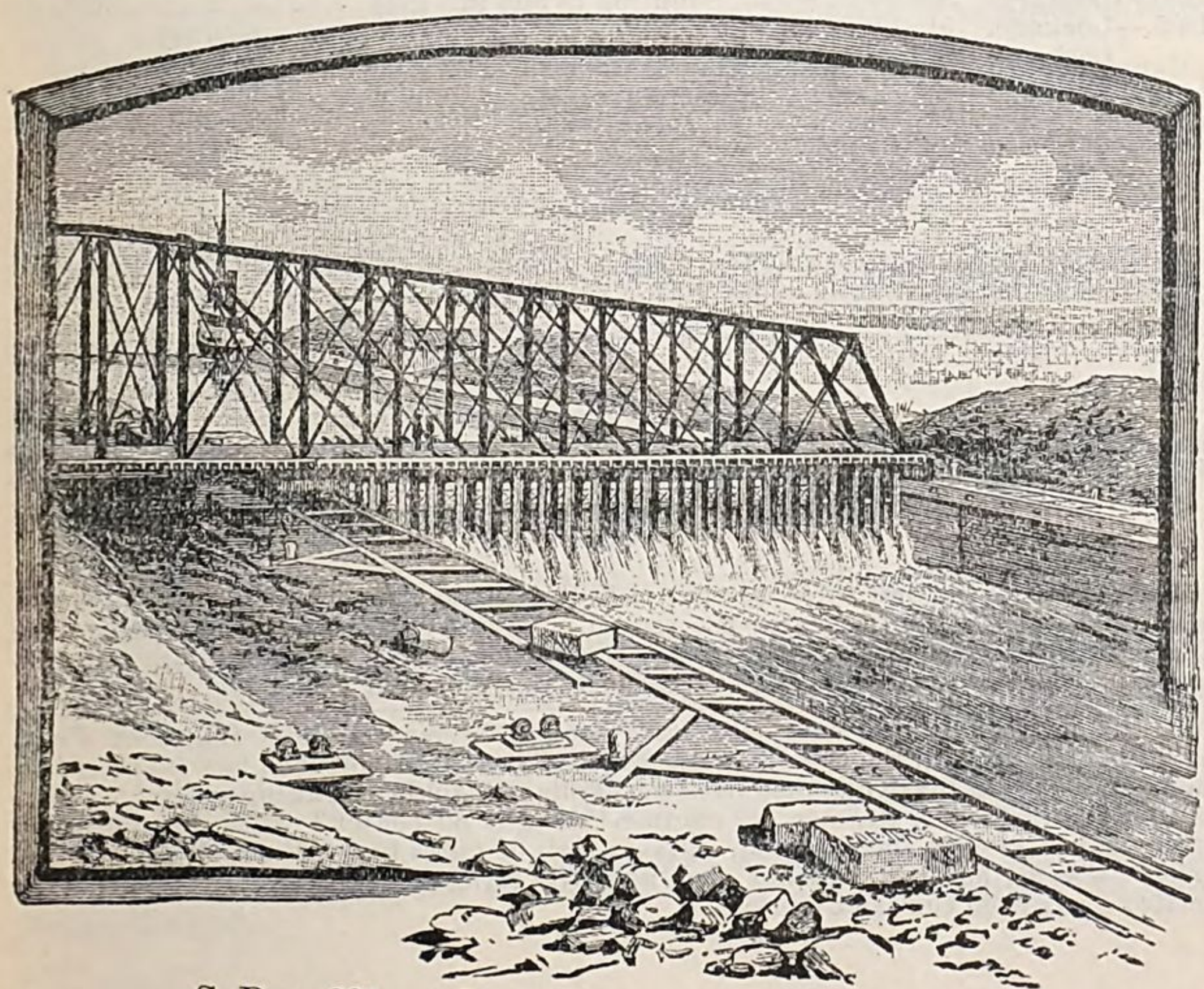
The inflow and discharge of the locks is provided for by two parallel conduits passing under the miter sills and lock floors; those for the inflow being 8 feet square, and having openings 2 feet square, occurring at regular intervals, under the whole length of the lock. This proves to be a perfect plan for the purpose, and is being copied, substantially, by the Canadian engineers.

The gates are operated by hydraulic power, in a simple but effective method, by which, in two minutes of time, the leaves are brought into reversed positions. Eleven minutes suffices for filling the lock, and eight minutes for its discharge. The lock and the canal are equipped with electric lights, and vessels are passing at all hours; the estimated capacity being 4 per hour, or 96 per diem. The greatest daily number passed to date was on June 14, 1887, when 87 were locked through. I recently witnessed a pleasing instance of international courtesy, when two Canadian Pacific Line steamers, of 2,000 tons each, were locked together through this United States canal, without toll or charge of any kind.

At the upper end of the canal is a novel arrangement of a guard gate, to be used in case of any serious displacement or damage to the operating lock gates; an accident which might convert the canal into the channel of a torrent, in which ordinary swing gates would not withstand the process of being closed.

This device may properly be termed a movable dam, and resembles, in appearance, an ordinary railway swing bridge, with the addition of a lower section moving in the canal prism. Its advantages are that it can be operated entirely on land, and, having slot openings, would not stop the current suddenly (being only partially shut, until each slot is separately closed), and thus this appliance would not invite the whole force of the current to crush the jambs or the gates.

The following wood cut will serve to indicate its form:



The possibility of this guard gate being called into requisition is not remote, for a heavily loaded steamship might easily surge against lock gates with force sufficient to carry them away singly, or through a series of lifts.*

The principle of the movable dam offers a reliable safeguard against such contingencies, and I can not too strongly recommend the adoption of the principle in its most improved form on the Atlantic and Pacific slopes of your water way, as of the highest importance. The credit of the above-mentioned device, I am informed, belongs mainly to Mr. Alfred Noble, formerly the assistant constructing engineer on this canal.

One feature of the new lock invites criticism. It is the drawing in of the chamber width at the gates, which is an unnecessary impairment of the capacity of the lock, as it prevents two vessels entering freely abreast. This feature is reported as being copied on the Canadian side, but in the latest and largest projected United States lock it is sensibly discarded altogether.

As before mentioned, the United States Government having engaged in the process of making all the lake-connecting channels of a minimum depth of 20 feet, new lock facilities commensurate with the increased draught became a necessary sequence. To provide these it was decided to remove the original locks already mentioned, and replace them by an enlarged lock with these unprecedented dimensions: 800 feet long, 100 feet wide in chamber and at gates, and having 18 feet lift, with 21 feet in depth over miter sills.

The gates are to be in two leaves of iron material, each of about 55 by 45 feet in area, and, as General Poe informs me, are estimated to weigh 124 tons for each leaf. Upon an intimation that I thought a plan involving less weight might be devised, he requested me to submit the same to him when I should have it fully prepared; this I intend to do in time for your company to have the benefit of his judgment as well as that of the Canadian canal engineers, who also desire to adopt improvements in this regard.

The Canadian Government having determined to build, at this point, a canal within its own territory, work has already commenced [under contracts to be completed in 1892], upon a canal 150 feet wide at bottom, with locks 600 feet long, 85 feet wide, and narrowed to 65 feet at gates, with 18½ feet over miter sills.

Assuming that both the United States and Canadian canal enlargements now in progress, will be in service at the commencement of 1895, the following growth of canal transit capacity in the first forty years of ship canal operations on this inland water course, will have been developed:

		Cubic feet.	Cubic feet.
1855.—Lockage.	350 by 70 by 16 (counting as one full lift)		392,000
1895.—Lockage.	515 by 80 by 16	659,200	
Lockage.	600 by 85 by 18½	943,500	
Lockage.	800 by 100 by 20	1,600,000	
			3,202,700

Increase, more than 8 for 1.

TRAFFIC DEVELOPMENT.

Surprising as the foregoing figures may be deemed, it will be seen that the traffic growth has a far larger ratio of increase. Thus:

	1855.	1888.
Registered tonnage	106,296	5,130,659
Tons freight, net (estimated)	30,000	*6,411,423

* Official.

The returns of the first three months of 1889 indicate that the freight tonnage will reach at least 7,500,000 tons, for the season. (Traffic to August 1, 3,426,051 tons.) The tonnage increase of the canal traffic (with a most liberal starting figure of registered, instead of traffic tonnage), is, therefore, in thirty-four years, over 60 to 1.

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*Since these lines were written, I have been informed by Chief Engineer Page, who has charge of all the Canadian canals, that such an occurrence has taken place more than once in his experience with the Welland Canal (extending between Lakes Erie and Ontario). A steamer, its engines "caught on center" when the engineer attempted to reverse their motion, caused a pair of gates to be disabled during the present season; and in a previous year an entire series of connecting lift gates were carried away from the same cause.

That the progress of annual development may be noted, the tables of yearly returns are to be annexed (see Addenda, page 45), by which it will be seen that there has been a steady advance from the beginning, and that at the same ratio of increase the traffic of 1895 will approximate 15,000,000 tons.

These astonishing results already attained have been realized, notwithstanding the fact that railways have been extended to all the principal points on both sides of this inland water course, from end to end, and also that Lake Michigan, through its Green Bay estuary, extends within 60 miles of Lake Superior at the point where the mineral belt commences, and there draws away several million tons (or more than one-half) of the iron-ore product along the South Shore region of Lake Superior,* the shipment of which passes east through the Straits of Mackinaw, or south through Green Bay and Lake Michigan, and, consequently, does not appear in the canal totals, as given above. (See map.)

THE CAUSE OF THIS REMARKABLE WATER-TRANSIT DEVELOPMENT.

The conditions causing and controlling this carrying trade are clearly set forth in official communications to the Chief of Engineers, U. S. Army, by General Poe, U. S. Army, dated United States Engineer's Office, Detroit, Mich., May 11, 1888.

It inclosed beside an admirable report by Mr. E. S. Wheeler, United States civil engineer, general superintendent of the Lake Superior Ship Canal. In it, as the result of a general inquiry among vessel owners, shippers, and consignees along this water course, the following data were established for the year 1887:

Average length of water transportation (Duluth to Buffalo), 811.4 miles.

Total of freight carried, 5,494,649 tons.

Total miles of conveyance for single ton, 4,458,544,804.

Total of freight charges, including terminal freight charges, $10,075,153.13.

Cost of water transit per ton per mile, 0.28 of a cent. Referring to the reports of the Bureau of Statistics of the United States, Mr. Wheeler found that the average freight charges of the railroad trunk lines for 1886 were 0.999 of a cent per mile, and the average cost as between land and water carriage was as 811 is to 183. It followed that the saving for the year to consumers of staples seeking a market through this canal was $34,557,140.

To this deduction General Poe adds the following remarks:

"It is not at all improbable that but for this water route, open for about seven months in 1887, the charges laid upon the freight carried would have amounted to $50,000,000. If this estimate is not exaggerated, and I think it is not, then the actual benefit to producer and consumer was fully $40,000,000 in that single year, divided among them in unknown quantities."

But Mr. Wheeler personally informs me that in pursuing the same line of inquiry for the year 1888 the existence of a decrease from prior water rates to that of 0.15 of a cent per ton per mile, or a reduction of about 44 per cent in that one year, was clearly established.

This would swell the total of annual saving to the shippers and the public, as resulting from the canal facilities, to the aggregate of nearly $60,000,000 upon the same basis of calculation as quoted on the authority of General Poe for the previous year.

Mr. Wheeler also predicts that the average of this year will reach still lower, and that the cause of these large reductions is to be found in the increasing use of much larger steamers, with freight-carrying capacities greater than ever before; the majority of these vessels now approximate 2,000 registered or 3,000 freight tons each, effecting by reason of such augmentation a great saving in expenses pro rata per ton as compared with the smaller craft of former years.

Here, then, is the primary cause and satisfactory explanation of the enormous developments of tonnage upon this inland water-transit line, namely, *in its being unapproachably cheaper than land carriage can ever be.*

THE BEARINGS OF THIS EXAMPLE UPON THE NICARAGUA ROUTE.

I. This is the only ship canal on the globe with lockage facilities upon a scale comparable with that proposed for the Nicaragua Ship Canal transit project, and it affords a realized example upon which to base calculations as to the future of that enterprise. If the tonnage of this canal route upon a water course composed of a cluster of inland lakes, paralleled through their entire length by railways, on both of their borders, and with competing adjacent water courses as shown, has actually increased from 1,567,741 tons of freight in 1881 to 6,411,423 in 1888, and presumably to 7,500,000

*At Escanaba, a city situated near the northern extremity of Green Bay, are docks with facilities for shipping ores on a more extensive scale than exist at any other port on the globe.

tons in 1889, what must be the traffic of the ship canal which bisects a hemisphere, saves 10,000 miles and fifty days of freight-steamer time between New York and San Francisco, and economizes proportionately in the time and the distance to and from innumerable other commercial centers?

II. The same commercial forces which have raised the Lake Superior Canal traffic to the proportions stated wait upon the opening of the Nicaragua route to render a large section of this continent tributary to it. My views as to the extent of the same lead to the prediction which I will now venture to make, *that the "Lake Superior" and "Lake Nicaragua" lock-lift canals will divide between them the carrying trade to European destinations of the products of the eastern slope of the Rocky Mountains, north of latitude* 40°.

That the transatlantic traffic of the western slope will go via Lake Nicaragua no thinking mind will gainsay; but how many have considered how far eastward of the Rocky Mountains the competing line between these rival lock canals may come? Let them trace the one-hundredth meridian of longitude and notice how it bisects the great wheat-bearing belt of the Saskatchewan and Missouri Valleys in Manitoba and the Dakotas.

Let them suppose the case of the owner of 10,000 bushels of wheat stored in an elevator upon that line of longitude, north of the latitude of Chicago, in the latter part of November. If he would ship by the Lake Superior Canal he must wait five months for the "closed season" to pass. (The annexed view of the original upper lock gate at the "Soo" during the five months of "closed season" will serve to illustrate the meaning of that term.)

The shipper by the Lake Superior route must add to his investment charges for interest, for insurance, and possibly for taxes during nearly or quite one-half of an entire year. After these drawbacks are met he must transport his grain by rail to Duluth; thence by steamer to Buffalo; thence by canal or rail to Montreal or New York; thence by steamer to Europe—this method of transportation involving three transfers en route. If, however, he loads his wheat on cars going West, they will deliver his grain at a Pacific seaboard, whence it will be carried by steamer through the Nicaragua Canal to Europe; a system of transit involving but one transfer en route, with no closed season whatever.

III. It is, from the foregoing premises, clearly deducible that the values of most of the exports, in at least thirteen States and Territories, besides several of the Canadian provinces, will be directly benefited by the water transit proposed by your enterprise; which will, in fact, constitute the small end of a funnel, the broad opening of which, reaching from Sitka to San Diego, extends eastward until it meets competing lines of water transit via Lake Superior or the Mississippi River.

In the accompanying map of this continent the different colors indicate the portions which in my judgment are to remain commercially tributary to its three main water-ways, viz: (1) The Lake Superior Canal and connecting lakes and canals. (Erie and Welland). (2) The Mississippi River and its tributaries. (3) The Nicaragua Canal. Also the remainder as connected with the seacoast.

Leaving this continent out of view, it appears that the currents of trade between this Central American route, in competition with those of the Suez tide-level canal will meet on the eastern coast of Asia, and that from the Straits of Sunda northward, trade and travel will gravitate strongly towards your route, moved thereto in no small degree by the attractiveness of the delightful scenery and climate of the Lake Nicaragua route, which will be in marked contrast with the intolerable heat and desolate surroundings which must always characterize a passage through the Red Sea and the Suez Canal, where no sailing ship is ever seen.

From these considerations the conclusion must be drawn that no artificial water way can be projected which will make such an extent of continental coast line and inland territory tributary to it as will be controlled by the Maritime Canal of Nicaragua, and that the data of the Lake Superior Ship Canal proves beyond peradventure that the Nicaragua Canal presents the most permanently profitable investment of its kind that can be offered to the public, because its position entitles it to be considered as the most important artificial water way on the globe, connecting, as it does, two great oceans at nearly the center of the habitable and consequently commercial zone, with all the traffic and revenues which that fact implies, in the light of the results furnished by the Lake Superior example.

NOTE.—Since the foregoing portion of this report was placed in type I have received from General Superintendent Wheeler an official statement of the traffic of the Lake Superior Canal for the year 1889, which is included in Addenda, page 45.

The only official report of the Suez Canal traffic for 1889 which I have as yet been able to obtain gives tables of the passages and receipts alone. But by comparison

of the latter with the returns in tons of previous years, I am able to approximate closely, and find the result to be, respecting these several arteries of commerce:

	Number.	Tons freight.
Lake Superior Canal lockages (1889)	4,684	7,516,022
Suez Canal passages (1889)	3,425	6,800,854
	1,259	709,168

It thus appears that the Lake Superior Canal, in 1889, exceeded the Suez Canal in volume of business over 33 per cent. in voyages and 10 per cent. in freight, and consequently now ranks *first* as to commerce on the list of the world's artificial water ways.

ADDENDA.

[Referred to on page 43.]

Tabulated official returns of the commerce passing through the Lake Superior Canal from date of opening, in 1855, *to* 1889, *inclusive.*

Year.	Sailing vessels.	Steamers.	Total lockages.	Tonnage.		Year.	Sailing vessels.	Steamers.	Total lockages.	Tonnage.	
				Registered.	Actual freight.					Registered.	Actual freight.
1855	(a)	(a)	(c)	106,296	(c)	1873	1,549	968	(c)	1,204,446	(c)
1856	(a)	(a)	(c)	101,458	(c)	1874	833	901	(c)	1,070,857	(c)
1857	(a)	(a)	(c)	180,820	(c)	1875	569	1,464	(c)	1,259,534	(c)
1858	(a)	(a)	(c)	219,819	(c)	1876	684	1,733	(c)	1,541,676	(c)
1859	(a)	(a)	(c)	352,642	(c)	1877	1,401	1,050	(c)	1,439,216	(c)
1860	(a)	(a)	(c)	403,657	(c)	1878	1,091	1,476	(c)	1,667,136	(c)
1861	(a)	(a)	(c)	276,639	(c)	1879	1,403	1,618	(c)	1,677,071	(c)
1862	(a)	(a)	(c)	359,612	(c)	1880	1,718	1,735	(c)	1,734,890	(c)
1863	(a)	(a)	(c)	507,434	(c)	1881	1,706	2,117	2,120	2,092,757	1,567,741
1864	1,045	366	(c)	571,438	(c)	1882	1,663	2,739	2,572	2,468,088	2,029,521
1865	602	395	(c)	409,062	(c)	1883	1,458	2,620	2,351	2,042,259	2,267,105
1866	555	453	(c)	458,530	(c)	1884	1,709	3,609	3,074	2,997,837	2,874,557
1867	839	466	(c)	556,899	(c)	1885	1,689	3,354	2,863	3,035,937	3,256,628
1868	817	338	(c)	432,563	(c)	1886	2,534	4,584	3,593	4,219,397	4,527,759
1869	939	399	(c)	524,885	(c)	1887	2,562	5,968	4,165	4,897,598	5,494,649
1870	1,397	431	(c)	690,826	(c)	1888	2,009	5,305	3,845	5,130,659	6,411,423
1871	1,064	573	(c)	752,101	(c)	1889	2,635	6,501	4,684	7,221,935	7,516,022
1872	1,212	792	(c)	914,735	(c)						

a No record kept until 1864.

c No record kept until June, 1881.

REMARKS.

The United States Government assumed control of operating the canal on June 9, 1881, when more full and accurate returns were instituted and maintained.

The west-bound freight amounted to about 33 per cent.

The Canadian freight, in 1888, amounted to about 6 per cent.

Cost, conveyance 5,494,649 tons of freight in 1887, estimated at $10,075,153, or, per ton per mile, 2.3 mills.

Cost, conveyance 6,411,423 tons of freight in 1888, estimated at $7,833,077, or, per ton per mile, 1.5 mills.

The consort masted barges are classed as sail vessels, but not used as such except in emergencies. No exclusively sail vessels are now regularly employed on that route.

The official estimate of expense for operating the canal for the year 1889 was $36,000.

PART SECOND.

OBSERVATIONS UPON THE ENVIRONMENT OF THE MARITIME CANAL OF NICARAGUA.

It may be well to state, incidentally, that in January, 1889, I received official notice that I had been named as one of the five engineers selected by the Construction Company to compose an advisory board of engineers to pass upon the surveys and the detailed estimates of cost of the proposed ship canal of Nicaragua, formulated by its distinguished chief engineer, A. G. Menocal, civil engineer, U. S. Navy. Also, that after my acceptance of such position, I was in attendance during parts of several months at meetings of the board in the city of New York, within which time special attention was given to the admirable series of maps and profiles which had been prepared by your engineering corps, as well as to the geological specimens and test-bore cores, of which a very complete collection was at hand for our consideration, together with all requisite explanatory information, supplied by Chief Engineer Menocal or his assistants of the surveying corps, Mr. R. E. Peary, civil engineer, U. S. Navy, and Ensign J. H. Maxwell, U. S. Navy, who attended meetings of the board for that purpose.

The reliable information thus at hand was sufficient to enable the board to arrive at determinate opinions in reference to the main features of the work, which, through our report, wherein we confined ourselves to the vital questiens of quantity and cost, have been made known as the collective conclusions of the examining engineers.

At a later period came the request contained in the introductory correspondence that I should, individually, enlarge the scope of observation, and consider and report upon circumstances and conditions other and beyond those to which the advisory board confined its inquiries. In complying with such suggestion, I desire at the outset to state that *my aim in preparing this report will be to explore fields of investigation not referred to by the able and distinguished experts who were my associates in the late advisory board.* With these preliminary remarks, I proceed to the consideration of certain fundamental features of this undertaking, as the basic conditions upon which to predicate reliable estimates, and also sustain the conclusions embodied in these pages.

FIRST.—*Local geological developments.*

Beginning at the deep-water line in the Atlantic basin, nearest the most northerly entrance to the San Juan River, the surveys prove that in securing 30 feet depth of water way, no rock formations will be encountered in the harbor basin or canal prism until the site of Lock No. 1 is reached. These most favorable geological conditions insure the practicability of excavating that portion of the Eastern section of the canal westward from Greytown Harbor, about 10 miles in length, by the aid of dredging machinery solely, where entire freedom from current agitation is assured, with convenient and ample dumping area under like conditions.

The excavation (as proven by the borings made by your surveying corps) will be either through alluvial silt, or sand, or clay formations together extending entirely across the delta of the Rio San Juan.

(Diagram A, attached, shows the composition of the canal prism between the ocean and the highlands of the San Juanillo range.)

The geological conditions of this section must consequently be regarded as extremely favorable for the rapid and economical construction of the work. There is also great economic significance in the fact that in these lowlands where, if at all, miasmatic attacks upon the working force may be anticipated, all excavation being effected by machinery, the operating employés will be sheltered from exposure to the sun and rain, and drilled in sanitary precautions—a course which will work wonders in maintaining health and vigor in the skilled labor required in the management of the all-powerful dredging appliances which modern ingenuity has supplied for the rapid and economical accomplishment of the extensive tide-level excavation required upon this section of the work.

In examining the next section, reaching from Lock 1 to the San Juan basin, above the Ochoa Dam, it is very gratifying to find that the first lock on the Atlantic slope will be placed upon solid rock foundations (see Diagram A), and that Locks 2 and 3 will also be located in rock ledges.

The importance of this beneficial feature, insuring the stability of the lock walls, is too apparent to need extended remark.

The nature of the rock through which the great "divide cut" and other "cuts" are to be made, is also decidedly favorable, in view of the fact that it is, as shown by the specimens exhibited, homogenous, and neither friable nor traversed by seams, nor decomposable to any appreciable extent by exposure to the elements. Hence, the sides of the cuts may be safely left at an angle but a few degrees removed from the perpendicular, thus effecting large reductions in the quantity of excavation usually required to render the slopes both safe and permanent. (See Plate I, Diagram 5.)

Passing by the lake level as not involving questions that require a study of geological conditions, I can but pause, when considering the location of the locks on the Pacific slope, to express admiration at the wonderfully-favoring geological formations which nature has furnished and the skill of your engineering department has shown to be available for those structures.

That, at the summit of the western slope of the continent at this point, there should rise, as a rampart for the long, summit level of the canal, a sufficient width of primeval rock into which the locks to regulate this mighty reservoir may be firmly bedded—thus to form the imperishable gateways of the descent to the level of the Western Ocean—is a fortuitous geological feature of great significance as presenting a perfect barrier against disastrous undermining casualties to the high-level water way, and also as affording the best possible conditions for permanance of the locks. (See Plate VII.)

A studious view of this section of the canal as it will appear when fully completed, will give force to the prediction that, when this work is an accomplished fact and when ocean steamers of the largest class, their decks crowded by hundreds of passengers, and their holds laden with thousands of tons of freight, are seen on the crest formed by Lock 4, majestically rising from, or descending to, the broad Pacific, that reaches out to the western horizon in unobstructed view below—the spectacle will be deemed to display one of the most impressive of the mighty engineering achievements of any age.

The test borings in the lower valley of the Rio Grande, completed at Brito during the past winter, show that the full depth of 30 feet will there be attained without encountering rock, and that a harbor as spacious as that of Chicago or Port Said may be made available by the simple and rapid process of inland alluvial dredging, duly protected by seaward entrance piers, thus assuring ample and economically constructed terminal facilities on the Pacific coast.

The geological conditions of the canal route are, therefore, as a whole, deemed to be of a *remarkably favorable character.*

SECOND.—*Topographical features.*

From the east the seaward approach to this grand interoceanic route is unexceptionable, as the proposed harbor at Greytown, when completed, may be entered or cleared by craft under sail, with the wind upon any quarter. Thence, extending nearly in a straight line of canal about 10 miles through the San Juan lowlands, a channel in full view from end to end will afford all possible facilities for rapid passage over the section extending between the harbor and the eastern locks.

Passing the locks, the Deseado basin will be available with extra width of water way up to the "divide cut," where a channel through 3 miles of solid rock will bring ships into the San Francisco basin, with its ample water way for clearance of counter-bound craft. Passing through three short "cuts," vessels will then enter the San Juan basin, with its surplus breadth of counter passage way caused by the water storage of the Ochoa Dam; thence into the great Nicaragua Lake; thence by canal into the Tola basin, resulting from the storage of the waters of the lake by the dam near Lock 4. This basin extends the upper level to a point but 4 miles distant from the Pacific Ocean, where in full sight of it, ships may lie, awaiting orders, making repairs, shifting cargo, unloading or transferring the same, alongside or at warehouse piers with all the unlimited accommodations of the shores of this landlocked lake at command, having upwards of 15 miles of water front, where every commercial facility may be obtained, all within easy access of the port of Brito. Graving docks of unsurpassed convenience may also be constructed in the Tola basin, owing to the ease of obtaining sluice discharge for dry-dock purposes. (See Plates VI and VII.)

The following important natural facilities for prosecuting the work of construction should not be overlooked:

Of 153 miles of route from Greytown to the mouth of the Lajas on the western shore of Lake Nicaragua, 90 miles border on water ways, with no sections of the entire work, except interiors of divide cuts, more than 2 miles distant from navigable waters, including under that head such as may be made available by certain inexpensive improvements, proposed by your chief engineer—the lines of which are indicated in red colors upon Plate I, his explanation thereof being annexed in a marginal note herewith.*

For the heavy work of the canal excavation, a construction railway will be requisite, and can be provided at moderate cost.

Along the western section, 17 miles in length, a double-track railroad will, of necessity, be provided; and must be relied upon for distribution of labor, machinery, and material. This represents, however, an average maximum haulage of less than 9 miles from either of the two bases of supply by water-transit, one being via the Pacific, and one via the Atlantic coast. The canal level being but 43 feet below the highest point on this section, it follows that subsidiary railway construction and operation along the working line will be upon easy grades with ample level spaces for side tracks and the other facilities requisite for the handling of surplus excavation, or of building material.

The paramount question of an abundant, and yet always controllable and reliable, high-level water supply for canal lockage and filtration is completely answered in this case by the presence of such equalizing reservoirs as Lakes Nicaragua and Managua. From these sources an average flow of 90 per cent. over canal-operating requirements is obtainable at ordinary level, while lowering the level of the lakes the depth of 1 foot, would afford an enormous surplus over any annual requirements, with regard to rainfall.

It appears from the latest surveys that the minimum radius of curves on the entire line can be established at 3,820 feet, which presents a route equal to a straight line, for all practical purposes of navigation.

The last topographical feature to be noted, is the ratio of minimum channel width to the whole distance to be traversed between the two oceans. This is found to be less than 16 per cent. of the whole passage. Of the entire route,† about 60 miles are in spaces sufficiently wide for the largest ships to navigate under sail, as in Lake Nicaragua; while about 76 miles are in the Deseado, San Francisco, San Juan, and Tola basins, where steamers may proceed under full headway, and pass one another in counter directions, with safe clearance space. Practically, this general result reduces the distance of canal navigation—properly so termed—between the two oceans, to about 27 miles; the remainder having the characteristic of an ocean estuary.

The result is a monument to the patient research and persistent explorations of

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*CHIEF ENGINEER'S OFFICE,
NICARAGUA CANAL CONSTRUCTION COMPANY,
44 *Wall Street, New York, December*, 1889.

DEAR SIR: I forward herewith a tracing of that portion of the Nicaragua Canal comprised between Greytown and Ochoa, showing the streams connecting the river San Juan, at the mouth of the river San Francisco and Greytown, with the eastern divide cut. The San Juanillo is navigable by craft drawing 4 feet up to the outlet of Laguna Bernard, and through this outlet and the lagoon to a point in the Deseado in the vicinity of Lock No. 4. From this point to the foot of the divide the Deseado can be made navigable with the same draught, by removing the logs obstructing the stream and the construction of three, and possibly four small low dams. In order to avoid the expense in building temporary locks to connect the different reaches into which the stream would be divided, I would be in favor of having scows in the reaches, and a derrick at each dam to shift freight from one scow to another.

The river San Francisco, when cleared of logs, will be navigable by the same class of boats to very near its confluence with the Chanchos. From that point to the foot of the "divide," on the west, the Chanchos and Limpio would afford transportation by the same method proposed for the Upper Deseado.

In this manner building material can be transported to the divide and the excavation commenced during the construction of the railroad.

Any further information you may desire, will be gladly furnished by

Yours, truly,

A. G. MENOCAL,
Chief Engineer.

CHARLES T. HARVEY, Esq., *C. E.*,
City.

† Total length from extremity of entrance piers at Greytown to like point at Brito 171.429 miles. (1.513 being in Greytown Harbor, and 1.136 in Brito Harbor.)

your chief engineer and of your surveying corps, and to the wise foresight of the management in providing means for a thorough exploration of the region thus traversed preliminary to final location of the route.

THIRD.—*Engineering Problems.*—Among other striking features of the undertaking is the fact that with such ample transit facilities in view, their realization involves *no unusual or overshadowing engineering problems or contingencies.*

The locks to be built are upon a scale already in use at the Lake Superior ship canal, and with advantages over the latter in having solid rock foundation throughout their entire length.

The sea approaches and the terminal marine accommodations proposed for this enterprise present no features which have not already been met by engineering talent at other commercial centers requiring facilities of a like character or upon even a more extended scale. The precedents thus fully established leave no elements of uncertainty in this respect, and these questions, therefore, require no special notice beyond a scrutiny as to quantities and cost—subjects, however, that are not now under consideration.

Being led, in the course of this examination, to concentrate attention upon the features of the route through the highlands—commencing at Lock No. 1 on the Atlantic slope, and extending thence westerly to the vicinity of the Ochoa dam—I find the subject to be one of such rare interest to engineering minds that I have caused a series of diagrams and views designated as "plates," to be specially provided and appended hereto, in illustration of the features worthy of particular remark.

Referring to Plate No. 1, attention is called to the strides which modern engineering has made along the line of experimental research, on which your chief engineer has shown himself such a successful leader. Not many years since, the vicinity of the Rio San Juan would have engrossed the entire attention of the engineering corps, upon the assumption that, as a matter of course, it must be adopted as the base line of the lock lifts and of the canal prism.

But patient and laborious explorations, surveys, and researches in many directions have shown a new and more desirable route to be practicable. This is accomplished by leaving the San Juan above its lower levels, and utilizing a series of minor valleys, occupied at present by insignificant streams, which when dignified by the overflow from the San Juan will, by the transformation, approach the sublimity of a new creation. This metamorphosis of mountain streams and interior valleys (now visited only by explorers and hunters) into a grand artery of interoceanic commerce, will be an achievement which the whole world may well applaud.

The process by which this result is to be accomplished is easily traceable on the first of these plates. Lock No. 1 will lift 30 feet above the valley of the Deseado and will create a lake, the overflow of which is provided for by a waste weir in the adjacent dam. Lock No. 2, with its 31 feet of lift, will, with its embankments, cause the formation of a lake rising to its level, while Lock No. 3, with its 45 feet of lift, will create a lake to fill the basin up to the base of the dividing ridge, at the point indicated on Plate I. Then follows the piercing of the transverse range of hills by the "divide cut," the dimensions of which are accurately indicated in Diagram 1, on the same plate. This is not a very formidable affair, at most; and when it is completed and three dams (see Diagram 3, Plate III) have been erected upon the branches of the San Francisco, and a "cut"—comprising less than one-third of a million yards of excavation, of which less than 10 per cent. is rock (see Diagram 2, Plate I)—connects the two valleys, a double lake will be produced, adding nearly 7 miles to the navigable water way. Another "cut" of a half million yards of earthwork, in connection with another dam at the Rio Danta (see Diagram 4, Plate III) will create an additional lake, adding 2 miles more to the navigable water way. Yet one more "cut," involving but a million and a half yards of earthwork excavation (see Diagram 4, Plate I), and we are ushered into the valley of the San Juan.

This expanse of artificial lake channels (see Plate I) requires but 24,990 lineal feet of supplementary embankments to secure their outer boundaries at points where watersheds or courses lead in other directions. This feature, coupled with the fact that most of the restraining embankments require but a few feet of elevation, the deepest gorge to be thus secured being but 21 feet below bottom level of the canal renders the aggregate of retaining embankment remarkably small. The same method has been successfully adopted in building the Ohio State canals, as the following extract from a recent publication indicates:

"The body of water which (in 1889) supplies the St. Mary's feeder of the Miami Extension Canal (of the Ohio State canal system) is about 9 miles long by 3 miles broad. It was formed by building two earth embankments from 10 to 25 feet high, one 2 and the other 4 miles long. About half of the area flooded was a prairie and the remainder a forest. The reservoir was begun in 1837 and finished in 1845."

With this example in existence, and taking into consideration the always reliable and ample surplus of the flow of the lake and River San Juan, that these valleys will prove abundantly retentive under the pressure of the proposed water filling, is placed beyond reasonable doubt.

This marvelously practicable route—having regard to the ease of formation of navigable basins and of their being artificially linked together in a continuous series—has the further admirable feature of exhibiting this feasible and ample water way extending along almost a straight line in the general direction desired.

OCHOA DAM.

The Ochoa dam is located at the point where the summit-level water way, formed in the valleys of subsidiary streams, as already mentioned, connects with the valley of the San Juan.

Here advantage is taken of a ridge of hills which contract the valley and form natural side embankments, which can be utilized with all the benefits thus provided free of cost.

The accompanying view(Plate II) of the natural ridge referred to is copied from a photographic view in the report of the United States Government survey of 1885.

These natural embankments reduce the dimensions of the dam required, as indicated by Plate III, to a size far from unusual, as is shown by the annexed table of comparative dimensions of works of this character existing in other localities.

Name of dam.	Location.	Length at top.	Total height.
		Feet.	*Feet.*
Villar	Spain	546	175.2
Gilleppe	Belgium	762	166.5
Puentes	Spain	925	164
Vyrnwy	Wales	1,350	146
Habra	Algiers	1,060	137
Tansa	India	8,500	118

Without entering into the details of the plans for the construction of the Ochoa dam suffice it to say that from the "divide cut" surplus excavation rock material wherewith to raise an embankment, answering the purpose of a dam, and of dimensions sufficient to render it as firm as the primitive hills by which it is flanked, may readily be brought by rail.'

To conclude remarks upon the subject of the dams located along this route, diagrams of the largest subsidiary dams are given upon Plate III, from which it will be seen that none of them are of such dimensions as to require special consideration. The total length of all of them combined, including Ochoa and those on the western slope is, but 11,720 lineal feet, whereas in the waterstorage and aqueduct system of the city of New York alone are to be found 7,569 lineal feet of dams already constructed, and 4,206 feet additional yet to be built, making a total of 11,775 feet, which is actually in excess of the requirements, in that respect, of this entire route from ocean to ocean.

Included in the last-mentioned estimate is the structure known as the "Quaker Bridge Dam" of the following dimensions: Length, about 1,400 feet; height, 265 feet from bed rock.

This, it will be seen, has 2¼ times the superficial frontage and 3¾ times the height of the Ochoa structure. If the criticism be made that it has not yet been completed and practically tested by use, the table on page 39 meets that objection by indicating the relative proportions of other dams of large dimensions *which are now in constant service.*

Turning westward, the effect of the Ochoa dam in raising the level of the river 58 feet at that point should be noted. It converts the lower valley of the San Carlos into a lake, the boundaries of which, indicated on Plate IV, extend southward about 10 miles in a straight line, and are flanked by hills upon the eastward side, except for the short distance of 5,540 feet where artifical embankments of but moderate elevation with due proportions of wasteweir will be necessary.

The problem of the effect of such massing of water filling upon the upper channel of the San Juan is happily one easy to solve.

Plate IV shows the course of the river to be in a well-defined valley, which maintains like characteristics throughout the entire distance from the Ochoa dam to the entrance of Lake Nicaragua, 64½ miles distant by the sailing line.

The whole distance is thus converted into slack-water navigation, and while requiring excavation at various points to secure the minimum of depth, the channel for a large part of the distance has such surplus of depth and breadth of water way as to insure the advantages of lake rather than of ordinary canal or river navigation.

Plate V, from a photograph in the report of the United States Government survey of 1885, presents a very clear idea of a portion of the upper waters of the San Juan

River—above the Ochoa dam. The view represents the locality near the Castillo rapids, midway between the dam and the great lake. The channel surface at this point will be raised about 20 feet, and it will be seen from the view that the banks of the stream are ample to keep the ultimate enlargement of the volume of water within favorable bounds.

The amount of dredging required to secure a navigable channel from the junction of the "divide" channel with the San Juan slack-water course, to keep deep water in Lake Nicaragua, has been ascertained to be 7,275,590 yards, distributed over a distance of 44 miles, including 14 miles of channel, deepening between the river head and deep water in the lake itself.

These results carry with them the proof of a grand conception and no words of mine are requisite to add to their force upon appreciative minds.

Passing beyond the magnificent expanse of lake surface, where navigation is unobstructed (in one portion of the course the distant shore scarcely appearing above the horizon), the construction operations necessary to extend the canal through the western land barrier, 15 miles in width, next claim attention.

This portion of the work displays among its features engineering devices of more than usual interest, shown upon Plates VI and VII. The first point for remark is the changing of the bed of the Rio Lajas near the lake, to prevent its crossing the line of the canal. This operation is favored by local topographical conditions, and frees the canal along that section from interference by floods. Thence by easy curves the canal crosses the divide between the Atlantic and Pacific slopes, through a cut, of which the banks rise to but 41 feet above the water level. What a monument to the exhaustive preliminary explorations and surveys made under the direction of your indefatigable Chief Engineer exists in this fact alone! Those who know, or who will trace the course of the stage-route between Lake Nicaragua and the Pacific coast, opened by Cornelius Vanderbilt in 1850,* will best appreciate the natural advantages of the route selected for the canal.

The next feature is the Tola River or La Flor Dam, the dimensions of which are indicated on Plate III, Diagram 2.

Located in a gorge of the mountains, and but 4 miles distant from Brito Harbor, it creates a lake of such proportions as to add 5¼ miles of navigable water way to the route, with no watershed leading westward requiring border embankments to guard the same. Here ends the summit level of the canal, extending from within 4 miles of the Pacific, to within 13 miles of the Atlantic, and including a system of natural reservoirs which appear as if originally planned to provide a water supply, unfailing and easily controlled, and which could hardly be surpassed for the purpose to which it is now to be applied. The situation of the locks have been hereinbefore remarked upon, except as to their lifts, which comprise two of 42½ feet each, Nos. 4 and 5, while that of No 6 is but 25 feet, as indicated upon Plate VII. Referring to the profile showing the relative position of the rock strata along the route, further mention of the admirable features connected with their location is not requisite, in view of the proofs afforded in Plates VI and VII.

The harbor of Brito, it will be noticed, lies in a comparatively sheltered position, and yet, like that at Greytown, can be entered by vessels under sail, with the wind upon any quarter.

Thus far as to the salient engineering features of this undertaking.

FOURTH.—*Climatic conditions.*

That climatic influences upon the general health of workmen, especially when migrating to a great distance in the execution of public works of such magnitude as that now under consideration, affect largely the monetary cost of the same, none can doubt. Those enlisting to labor in such undertakings invariably and wisely, take into account the possibility of detrimental effects of the climate upon their health, when stipulating as to remuneration.

After careful and extensive inquiries in that regard, I am satisfied, as I think other candid minds must be upon similar investigation, that the health conditions are, in this case, essentially favorable to the work, and that the section of Central America traversed by the canal is entitled to be classed as a healthy region.

The lowlands of the San Juan are the most exposed to miasmatic influences; but the work there being wholly done by machinery, and the operators being mainly under cover and subject to control as to matters of food and sleep, modern sanitary appliances, as previously remarked, will neutralize such deleterious influences to a great extent.

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*The course of this once frequented route can be traced upon the model lately on exhibition by the Maritime Canal Company. In traversing this "divide" travelers were led across elevations over 600 feet in height.

On the highlands of the eastern slope, where the greatest number of men will be required, the drainage is good, with clear spring water in abundance. The well-known trade winds of that zone circulating from ocean to ocean with a regularity found nowhere else on this hemisphere, clear the atmosphere and moderate end equalize the temperature to a degree affording incalculable benefits and physical comforts along the San Juan Valley,* while in the vicinity of Lake Nicaragua and on the Pacific slope the same proverbially healthful climatic conditions are found as prevail upon the coast of California.

A practical proof of the reliability of these conclusions is supplied by the record of the company's surveying corps of 1887–'88, consisting of sixty men transported from New York and more than one hundred natives enlisted on the spot, all of whom encamped along the line for many months; and yet, as Ensign Maxwell informs me, not one of the party was prostrated for more than a day or two by sickness, and the original party returned to New York in better general health than when they left that port.

This incident, so recently and so reliably attested, has a special and most favorable significance.

FIFTH.—*Commissary, sanitary, and police organization and supervision.*

The affairs of administration indicated by this caption all pertain to the cost of carrying on the work, and while more especially within the business department of the enterprise, seriously affect also its engineering resources, consequently they are deemed proper to be herein mentioned in an advisory way.

The quality and quantity of food to be furnished to the working force should not be left to the caprice of speculators, nor to be dispensed by those seeking a profit in so doing, for upon the maintenance of a proper standard and supply of diet largely depends the reliability and vigor of the laborer. Neither should sufferers from accident or sickness be committed to the care of casual sympathy or chance acquaintance. The company should retain control of the food supply, and medical and surgical care and attendance should be regulated by special arrangements which will secure reliable and competent management of details in these important departments.

My own experience as business manager of the company which built the Lake Superior Ship Canal enables me to state that in that undertaking the observance of such a policy as here indicated was an indispensable element of the success then and there attained. Before the visitation of epidemic cholera in 1854 official control of the food supply and the medical oversight of about four-fifths of the working force of nearly three thousand men was committed to my charge, and a hospital with a corps of skilled attendants was also instituted under my supervision. When these precautions were tested by that terrible scourge the result disclosed a loss of less than 5 per cent of the cholera cases under my control, as against a loss of fully 95 per cent of those who did not come within the lines of my sanitary regulations—in an aggregate of several hundred deaths at that time and place.

It is assumed that your company, directed by a wise foresight, will organize and retain control of an efficient police and sanitary corps, patrolling the entire line of work for the enforcement, not only of personal and property rights, but of strict and comprehensive sanitary and sumptuary regulations.

SIXTH.—*Sources of labor supply.*

When considering this important element of cost, I learned from reliable sources that hardy and efficient laborers at lower rates of wages than are current in this vicinity may be obtained in large numbers from the west coast and from the mountain districts of Mexico. Also, that negro labor, duly acclimated, may be drawn largely from the Mississippi Valley and from the West India Islands. Southern European countries, it is well known, can contribute sturdy white workers of a higher grade, while skilled labor can be furnished in abundance from this vicinity; and from all these sources workmen can be conveyed by water direct to the line of the work. These conditions are, therefore, to be classed as remarkably favorable in all respects.

This subject completes the list of features worthy of special consideration, which together constitute the conditions of which a knowledge must precede the formulation of reliable estimates of the cost of the proposed undertaking.

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* This portion of Central America is elevated but 110 feet above tide level, being the least obstructed by mountains of any part of the Pacific coast from Alaska to Patagonia. The refreshing trade winds, with a freedom of circulation caused largely, no doubt, by the remarkable depression in the longitudinal mountain ranges (elsewhere presenting barriers ranging from 1 to 2 or more miles in height), here maintains a "stiff breeze" during several hours of each day throughout the year.

CONCLUDING OBSERVATIONS.

The revised estimates of the advisory board were concurred in by me as embracing an ample estimate of the cost of constructing the Nicaragua Ship Canal under favorable conditions of financial administration and executive ability.

In that estimate there is, in my judgment, a margin for contingencies sufficient to include the enlargement of the locks from the capacity proposed by your chief engineer to the advisory board, viz, 650 by 80 feet chambers, to the size I would earnestly recommend for adoption, viz, 1,000 by 100 feet. These dimensions will be of the same width and but 200 feet longer than those adopted for the new lock of the Lake Superior Canal, where experience has demonstrated the economy in time, or locking through several vessels together. The reasons for this increase I will, if desired, submit in a separate report at a later date, prior to the time when the progress of the work will necessitate your decision.

To my mind it seems clear that when investors examine the schedule of cost as reported by the advisory board, the more scrutiny they bestow upon it the earlier will they reach the conclusion that under no ordinary contingencies will it be exceeded by the actual outlay; and that when open for traffic the canal finances will be as easy of management as its water way. When thus opened, the crisis of both will have been passed, and both alike will command the admiration of the world. Let him who desires to leave his accumulating wealth where his posterity will find it intact in form, and of constantly increasing value, from the growth of commerce between the nations, duly appreciate this golden opportunity.

The world at large may adopt many novelties in methods of transportation, but to supersede the economies secured by such an interoceanic water way is not among the possibilities of human progress. The expenses of the Lake Superior Ship Canal in lock lifting nearly 8,000,000 tons of tribute-paying freight during this year are officially estimated at $36,000, or at the rate of about four-tenths of a mill per ton. What other form of transit can present such results?

REVENUE ESTIMATES.

It will be presumed that in a general review of the principal features of your enterprise the important subject of the extent of its probable traffic will not pass unnoticed; but while appreciating that fiscal promise is the one prerequisite of every incipient enterprise, of this nature, I leave this branch of the subject to others whose experience renders them more facile than myself in that line of expert estimate.

COMPARISONS.

The old adage that as between persons "comparisons are odious" applies, in my judgment, with special force to indiscriminate suppositions of parallels between existent or proposed ship canals. Many have assumed a similarity of conditions as affording a basis of comparison between the Nicaragua, the Suez, or the Panama routes; and, moreover, finding errors in calculations proven in the estimates of cost in the last named enterprise, they proceed to infer like results in the first, especially in the line of deductions respecting the unreliability of engineering estimates relating to the time and cost of construction in one of those undertakings as applicable alike to all of them, when in fact there is and can be no practical ground of comparison. To emphasize this conclusion it may be well to devote a short space to a review of the main features of the other projects thus compared with the Nicaragua enterprise.

THE SUEZ CANAL.

Let the Suez Canal be first considered. It is a water way, excavated mostly through a sandy desert for a distance of 88 miles,* connecting two tide-level seas. It was projected as long ago as in the time of the Pharaohs. The historian Herodotus, who lived in the fifth century B. C., asserts that Pharaoh Necho expended 120,000 lives working upon it. The same writer refers to it as being used in his time and as wide enough to admit of the passage of two vessels abreast, while the passage is described as occupying four days.

It was subsequently allowed to fill up with the shifting sands of the desert and it remained thus until its restoration was undertaken by M. de Lesseps, in conjunction with the Khedive of Egypt, in 1858. It was formally reopened November 17, 1869.

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* Sixty-six miles of dry excavated channel, 14 miles of dredged, and 8 miles of natural-lake passage way.—Encyclopedia Britannica, Vol. IV, Page 791.

The problems presented were, from an engineering point of view, of the simplest kind, involving merely an open cut upon and between tide levels. It has, however, as to its main features, to meet a danger and expense that was and still remains unique; namely, the constant tendency of natural causes to choke it with shifting desert sand. This menace requires the counter force of dredging and led, at the outset, to opinions by distinguished engineers that the income would not warrant the expense. It has, however, been a triumphant vindication of M. de Lesseps' faith in the ultimate success of the undertaking; in 1888, with a total income of 45,242,021 francs but 7,743,064 francs were required for the operating expenses. The increase of revenue for 1888 over 1887 was 12¼ per cent. The average time of passage was 30¾ hours. The latest annual report shows that 3,998,914 cubic meters of sand were removed from the canal during that year. This represented, in part, the accumulated drift from the desert simoons, and also the excavation consequent upon gradually widening and deepening the channel. It is reported that this work will be so far completed by another year that two vessels will have clearance for counter passage at any point.

It is now about twenty-one years since the narrow channel was first opened for traffic. The proportion between sand drift and new prism area removed last year was not stated in the report, but there is no doubt that were this continuous warfare against the climatic force which dominates in that desert region to be altogether abated, the canal would, in the process of time, be quite obliterated for many miles of its length.

These being conditions peculiar to the Suez Canal, how evidently absurd is any attempt to draw engineering comparisons between it and the Lake Nicaragua route.

THE PANAMA CANAL.

Comparative examination of the Panama project, however useless from an engineering standpoint, yet, as connected with M. de Lesseps, the successful projector of the Suez Canal, invites a measure of consideration, as affording an interesting study of the history of an attempt to make assumption wear as well as fact.

To studious engineering minds the Panama problem originally presented collateral difficulties equal to those incidental to the canal itself. The route of the canal from Colon westward follows the ascending valley of the Chagres River. That water course must be controlled, but how? Given a river draining an area of about 1,400 square miles; discharging in the dry season at its first point of contact with the line of the canal 15 cubic meters of water per second, but in the wet season 4,670 meters *in the same time,* precipitated mainly from numberless steep ravines and high mountain sides, from whence the rainfall quickly concentrates in the main outlet and often in a few short hours, causes a rise in the Chagres River of from 20 to 60 feet in height of solid water pressure, increasing its volume to *over three hundred times its minimum discharge!* * This, M. de Lesseps contended, might be controlled or eqalized by a reservoir. To accomplish this end a stupendous dam a mile or more in length, 120 feet high, and 250 feet thick at base, was calculated by French engineers to be necessary, and was to be located south of the canal and at a considerable distance therefrom in a subsidiary mountain gorge.

But even with the dam complete the overflow must still be provided for. To dispose of this there was proposed a tunnel, to be bored for miles through the mountains, with dimensions sufficient to convey the surplus flood into another valley for exit to the sea.

That M. de Lesseps should seek every possible way to avoid the cost and delay of these gigantic preliminaries is not surprising; but for the ostrich-like policy of hiding the head of the dilemma by means of a vigorous show of digging upon the canal proper, while the body of the difficulty remained uncovered, there could be but one ending, namely, the probably irremedial disaster already developed. The giant floods of the uncontrolled Chagres River now hold undisputed sway over the route of the canal whenever appearing in their torrential strength.

Other difficulties, more or less serious in their nature, must be overcome to achieve final success in the line of that effort, but one of which will now be remarked upon.

It was the popular impression obtaining at the time of its commencement that the Panama was, like the Suez route, to be a tide-level canal.

But tidal differences existed which precluded such similarity. The tides of the Mediterranean Sea have but 12 inches of variation between high and low tide. Likewise those of the Red Sea change but 30 inches from mean level; hence a connecting channel between them through an "open cut" was practicable. But on the Panama route, while the maximum variations of the Atlantic tides at Colon are but 1 7/12 feet,

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* Some expert estimates place the maximum of these floods at 165,000 cubic feet per second, or at nearly half the flow over Niagara Falls!

those of the Pacific at Panama show changes of 21 $\frac{3}{4}$ feet in level. This feature, it will be readily seen, necessitated the existence of at least one lock on the Pacific coast, and if but one, then with double gates to meet the alternate water pressure in opposite directions.

And yet it was generally understood that the original plans called for *no locks* in the Panama route. Afterwards, this feature was reconsidered, and a series of locks were officially announced—but without provision for supplying the highest level, except by pumping.

Such circumstances point to the conclusion that there had been no carefully studied and matured plan of construction, with a fixed estimate of cost, but only a vague and uncertain groping after a result—to be arrived at by whatever means circumstances might determine, and at whatever expenditure of time, money, and life, chance should decree. The case is therefore in no wise analagous with the Nicaragua route, excepting as to the use in common of the word "canal."

My conclusion is, that the only canal which can at present be referred to as similar to your enterprise, is the one of which a sufficiently extended notice has been already given, to wit:

THE LAKE SUPERIOR SHIP LOCK CANAL.

It ranks with yours in its lockage capacity; like yours, it has an enexhaustible reservoir on its upper level; and again, like yours, it has required the deepening of natural water courses to furnish a continuous and capacious ship channel. Also, this canal was built within the original estimates of time and cost. It has been in uninterrupted use for over a third of a century, and maintains an ever-increasing volume of traffic—which is but an example of what the Nicaragua Ship Canal will demonstrate in its cost and durability, and will develop as to dividend-earning qualities, whenever a suitable opportunity is afforded to test its performance.

IN CONCLUSION.

When taking leave of this subject, the professional mind is led in two directions: *First.—Retrospectively.*—Upon looking back to the commencement of the present century, the retrospect discloses the energies of the world engrossed, in the main, by the profession of arms and in warfare on land and sea. Railroads and steamships were unknown, and the science of engineering was in its infancy—even the title of civil engineer being almost unused. On the first of January, 1891, the last decade of the century will have commenced. What a change will then be traceable between the opening of the first, and of the last tenth of the cycle! Now, the engineering profession, including therein its civil, mechanical, and architectural divisions, is in the van—the leader of the world's energies.

Second.—Prospectively.—Notwithstanding the vast strides with which modern improvements have lately advanced, it is safe to assume that the last decade of the century will witness its most notable achievement in the completion of the inter-oceanic canal of Nicaragua. In the progress of its construction the power of applied science will have its fullest scope.

Mammoth dredging machines, unknown to our fathers, will plough their way with irresistible force and marvelous rapidity from the shores of the Caribbean Sea to the foothills of the San Juanillo range. There, steam and air drills and the dynamite genii will attack the rocky ledges, and where naught but the untrodden wilderness can now be seen, leave behind them the grandest highway of the nations. When the locks and dams have taken form, Lake Nicaragua will become a central rendezvous for the fleets engaged in the commerce of the new world. Electric lights will render the dark cañons of the "divides" and the entire route of the canal, as passable by night as by day; and by its far-reaching wires, the telegraph will convey dispatches from every section of the noble water way to the commercial centers of both hemispheres.

All these forces, in combinations not known or suggested in A. D. 1800, will, no doubt, before A. D. 1900, have secured the completion of this grand conception. That it will be a fitting culmination of the engineering achievements of the Nineteenth century, who can doubt?

I have, in conclusion, only to remark that I shall deem myself honored by having aided forward, in anywise, the consummation of this project, insuring such vast utilities; and also that I feel impelled from the study of the data referred to herein, to congratulate its managers upon having already guided it to so favorable an opening of its record.

Very respectfully,

CHARLES T. HARVEY,
Civil Engineer.

NEW YORK, *December*, 1889.

APPENDIX C.

To the Stockholders of the Nicaragua Canal Construction Company:

I take pleasure in presenting to you the report of the division engineer of our company, covering the work performed prior to October 8, 1890, and also the report of our chief surgeon upon the hospital service and the general health of the employés of the company in Nicaragua.

The report of the division engineer is a very complete statement of the work done by our company, and will, I believe, satisfy all interested that the work during the past year has been pushed with great vigor and success. The health of the force during this time has been remarkably good, and there is no longer any fear that the work can not be successfully prosecuted because of climatic causes. I also have to report that our concession from Nicaragua was confirmed by the Nicaraguan Government early in November; a commission appointed by the President of Nicaragua having made a thorough examination of our work reported to the Government that we had complied with all the provisions of the concession, and had expended much more than the $2,000,000 required to be expended during the first year. By the confirmation of the concession the rights of the canal company have been rendered permanent.

I am also able to report that the depth of water on the bar at Greytown is now 12 feet; having received a cable a few days ago from Chief Engineer Menocal to that effect. It is expected that the water on the bar will be deepened to 20 feet within the next four weeks, which will give us a sufficient depth of water for all vessels to enter the harbor and unload at the company's wharves. I therefore feel justified in congratulating the stockholders of the Nicaragua Canal Construction Company on the present favorable condition of the work.

Yours, truly,

WARNER MILLER,
President.

NEW YORK, *December* 17, 1890.

REPORT OF THE DIVISION ENGINEER.

WORK PERFORMED BY THE NICARAGUA CANAL CONSTRUCTION COMPANY PRIOR TO OCTOBER 8, 1890.

SAN JUAN DEL NORTE, NICARAGUA,
October 19, 1890.

SIR: I would most respectfully submit the following report of the work done by the company in Nicaragua prior to this date.

The surveys for the final location of the entire canal line have been completed and the detail surveys of the sites of all embankments, dams, and locks are very nearly finished.

This survey has covered not only the one line selected, but any and all routes which gave any probability of being practicable, and in many cases covers a width of several miles of country.

In addition to actual surveys the whole country has been thoroughly explored, so that every range of hills and every small stream has been examined to ascertain what, if any, bearing it might have upon the general problem of construction.

The south bank of the Rio San Juan has been carefully examined from Ochoa to the Rio Colorado, and extending back from the river several miles, to ascertain if there was any more favorable location for a dam than the Ochoa. Most of this region is a lagoon country, with low disconnected hills. No favorable site for a dam was found.

The surveys for a railroad line from America to Ochoa, keeping above the flowage line in the basin, have been completed. It was a difficult piece of location, as the hills bordering the basin are very steep and badly cut up with lateral drainage.

The cheapest and best line for the railroad would have been found on the crest of the ridge bordering the valleys of the Deseado and Limpio, on the south side; but as this ridge is from 400 to 1,000 feet in height and from 1 to 3 miles away from the canal, it would be of no use for construction purposes. So we were forced to locate on the hillside, necessitating a great deal of very careful work to make a location that was at all practicable.

Another line has been located from America to the divide for a temporary road for constructing purposes, keeping in the valley of the Deseado. As the Deseado is a very crooked stream, with high hills coming down to the water on both sides at frequent intervals, it required a large amount of preliminary work to decide on the best location.

Careful detail surveys have been made for the location of a dam and reservoir on the La Paz Creek, about 12 miles from this place; also for the pipe line to bring the water from that point to America. Several other streams were examined and careful surveys made to ascertain where the best and most economical supply could be obtained. All things being considered, the La Paz was found to be the most desirable.

At the points selected the stream has an elevation of 100 feet above tide and pours over a ledge of trap-rock between two high hills, forming an excellent site for a dam, which will raise the water to an elevation of 115 feet.

The stream in the dry season will furnish a supply of pure, cold water, amply sufficient for all the demands likely to be made upon it.

A careful survey of the site of the proposed harbor at San Juan Lagoon has been kept up during the past year. This has been necessary to keep a record of the rapid changes which have taken place, owing to the construction of the breakwater.

In order to make the proper studies of the work, it has been necessary to make new maps of the coast line for some distance on each side of the breakwater each week and also to show the depth of water ascertained by careful sounding, extending from the lagoon across both the inner and outer bar to deep water. One party has been constantly employed on the work.

A careful survey is now in progress, and nearly completed, of the country between the mouth of the Lajas and Brito for the location of a railroad, to accurately locate all the property lines, to decide where diversions of streams are necessary and practicable, and to locate sites for disposing of waste material.

All the surveys have been carried out in such a manner as to check the accuracy of each other, and no errors have been allowed to go uncorrected.

The maps have been made with the utmost care to insure correctness. All work has been carefully checked by at least two men. I have no hesitation in saying that no important error can exist in the surveys or maps. I have never seen or known of so exhaustive and accurate surveys and maps having been made for any public works.

These surveys have necessarily been slow and expensive, being prosecuted in a tropical forest where nothing could be seen at a distance of 50 feet, and where every step had to be preceded by a blow from a matchet to clear away the tangled mass of vines which everywhere presented itself, where all supplies had to be transported in canoes up streams filled with logs and then packed on men's backs for miles over hills so steep that a man can only climb up and down by holding on the small trees and brush, much of the time with the rain pouring in torrents, or through swamps where for long distances men have had to flounder through thick mud from their waists to their armpits in depth. To one who has never conducted such a survey no description can give an accurate idea of the slowness, difficulty, and disagreeableness of the work; but you, who have personally conducted so many surveys in this country, do not need any further comments.

At first it was attempted to house the engineering party in tents, but experience soon showed that they would not answer in this climate and they were abandoned, the parties living in shacks, thatched by palm leaves. Many thousands of dollars have been spent in building temporary camps for the accommodation of employés.

To ascertain beyond question what the character and cost of the work was to be, borings have been made at the site of all important works, such as dams, embankments, and locks as well as at the heavy cuts. Where there were no rocks this has been done with earth augers. Wherever rock was found the diamond drill was used. Specimens of all the different strata have been preserved for future reference. These holes have been bored to the bottom of the canal, or to the bottom of the foundations of all locks, etc. Many of these holes have been from 200 to 300 feet in depth. By using the diamond drill, which takes out a solid core, we have been able to preserve specimens, so that contractors and others interested may at any time see exactly what the work will be. Owing to the difficulties in transporting heavy machinery, steam drills were impracticable, so all this work has been done by hand.

In May, 1889, a large force of engineers and foremen, with supplies and machinery, left New York and landed here early in June, to begin the actual work of construction, but owing to circumstances over which the company had no control, the work of construction did not assume important proportions for several months. In the mean time much necessary work was done.

As the company had no quarters to accommodate a large force of men, a temporary camp and storehouse were constructed at Camp Francis, at an expense of several thousand dollars. This was used until the new storehouse and quarters at La Paz were completed.

Several other camps, Camp Folly, Camp B, No. 1, etc., were built at a large expense, as, also, was a temporary wharf, which had to be constructed before lumber could be obtained, and which, while they answered their temporary purpose, were soon abandoned and entirely disappeared.

A steam snag boat was put to work clearing the streams—up which supplies must be taken—of logs and overhanging trees. These streams were filled with logs, the accumulations of ages, many of which were buried in sand and as heavy as lead. They could only be removed by the assistance of divers and a liberal use of dynamite.

The San Juanillo and Deseado were cleared so as as to give steam navigation to Camp Satisfaction, a distance of over 30 miles by river, and to Camp Virginia for canoes in ordinary water. From Camp Virginia to the divide, a distance of 5 miles, about, a good trail for packing was cut and foot bridges built across all the streams, so that supplies could be transported with certainty, though slowly, to the divide.

As it was proposed to obtain a temporary supply of rock for the pier from Silico Lake, the outlet of the lake, which was a very crooked stream, filled with grass and snags, was cleared out, straightened, and widened so as to allow tugs and lighters to pass from the San Juanillo to the lake; in many places points which were too sharp to allow a boat to pass around were blown off with dynamite and cleared away.

The San Francisco was cleared above the junction of the Chanchos, and the Chanchos cleared to Camp Salinas. These streams were all in a very bad condition and required much labor.

The necessity for a telegraph line to the interior soon became apparent. This was one of the first works undertaken, and was pushed through to Castillo, a distance of 60 miles, as soon as possible. This was a difficult line to construct, as the first 10 miles was through the deep swamp back of San Juan, where the clearing was difficult and the poles hard to obtain, where the wire and all other supplies had to be carried on the backs of men, who were wading in water from 1 to 4 feet in depth. Much of the way the water was so deep that poles could not be set in the

ground, and had to be fastened to stumps with wire as the only means of securing them. From the Divide to the Castillo the line is over a very rough country, was an expensive line to construct, and is a difficult line to maintain.

During the summer of 1889 some preparatory work was done at Silico Lake and quite a sum of money expended in building a crib and sheet-pile wharf. No active work on the excavation of rock was done until July, 1890, when a force of men was put to work and all the rocks which have been used at the breakwater quarried. The quarry was only a mass of large bowlders imbedded in clay. This supply has been exhausted and the quarry abandoned. The rock was brought from the quarry to the pier in lighters, and as it all had to be handled twice after being quarried, it was very expensive.

During the summer of 1889 permanent buildings were begun and building construction has been in progress ever since.

The following list gives the size and purpose for which the more important buildings were erected:

Buildings.	Dimensions.	Buildings.	Dimensions.
	Feet.		*Feet.*
Chief engineer's, two stories	24 by 40	Mess hall at La Fe	25 by 50
Office and officers' quarters, two stories	25 100	Carpenter shop	20 50
Dining room for officers	20 40	Paint and tin shop	12 25
Kitchen for officers	20 20	Oil house	20 30
Laundry at headquarters	30 16	Storehouse	24 54
Bath house for chief engineer	8 10	Office and officers' quarters at railroad	24 45
Bath house at headquarters	8 22	Mess room and kitchen at railroad	16 26
Outbuildings, etc		Mechanics' quarters at railroad	24 60
Doctors' residence, two stories	41 47	Laborers' quarters at railroad	35 170
Officers' hospital, two stories	30 48	Laborers' quarters kitchen at railroad	24 40
Laborers' hospital, two stories	20 93	Tool house	12 17
Mess hall of patients	30 54	Tool house and blacksmith shop	24 60
Storeroom and quarters	19 25	Water tank for locomotive	
Dead house	15 27	Engine house	36 86
Bath house, two stories	11 11	Officers' quarters at Camp Cheney	30 40
Outbuildings, etc		Laborers' quarters at Camp Cheney	25 96
Laundry for hospital	15 37	Storehouse at Camp Cheney	
Storehouse at La Fe, three stories	39 139	Blacksmith and machine shops at Camp Cheney	
Dry house	15 37		
Quarters for employés	15 40		

There is now in process of erection a machine shop, 108 by 54 feet, and a blacksmith shop and foundry, 28 by 52. Much of the machinery for a first-class machine shop is now here; also materials for a building for offices and quarters, 46 by 57, two stories, foundations of which are completed. These are all good, substantial buildings, roofed with iron and painted.

The storehouse of La Fe has a substantial wharf, 30 by 50 feet, with shears and tackle for unloading heavy freight.

Work in the canal clearing was begun in January, 1890, and about 11 miles chopped the full width of 486 feet; a large part of this was burned during the dry weather of April. The chopping through the swamp was done in January, when there was a rainfall of 64 inches, and the water was very deep in the swamp. This could have been done at a less cost at a later date, but it was felt that it must be done then to allow the first dry season to be taken advantage of for burning. This was the most difficult portion of the line to clear.

As all the water in the vicinity of San Juan del Norte is contaminated by decaying vegetable matter, it was decided to seek a pure supply in the highest hills back of the swamp.

After a careful examination of several sources, the Caño La Paz was finally selected. At a point about 10 miles from here this stream flows over a bed of solid trap-rock at an elevation of 100 feet above tide. At this point the valley is narrow, being shut in by high hills, affording an excellent site for a dam. The dam will be 15 feet in height, and will raise the water in the reservoir 115 feet above tide. With this elevation the reservoir will contain a supply sufficient for several weeks for all the demands likely to be made upon it.

The water will be brought to this point in a steel pipe 8 inches in diameter. All of the materials are here, including gates, sluices, screens, valves, connections, etc., and 15 miles of pipe. The site of the reservoir is cleared, and the laying of the pipe is only waiting for the railroad to reach that point, as the pipe for most of the way will follow the railroad.

In 1889 a tramway was constructed from La Paz to the hospital, a distance of a mile and a quarter.

In June, 1890, a railroad was begun across what has been considered the impassable swamp, between the San Juan Lagoon and the Benard Lagoon. Soon after beginning, heavy rains set in, and the swamp was flooded to a depth of from 2 to 4 feet. The track had to be laid in advance, and the dirt for filling brought out by train. This was done by building up a corduroy of logs, and laying the temporary stringers running lengthwise of the track, on which the ties were placed and the track laid. Most of this work for a distance of 2 miles was done in water 3 feet deep, and much of the work for 4 miles more in water 2 feet or more in depth, making a total of 6 miles of swamp work. After the rails were laid the trains of dirt were pushed out and unloaded along both sides with a ballast unloader, and as the bank was raised above the water the track was raised and put into shape on a solid roadbed of sand. In order to make the road safe at all times, the grade has been put above the highest known water. As this could not be done at once there has been a large force of men at work raising, lining, and stamping the track since construction began. The materials for the road have been excavated from the entrance of the canal by a steam shovel, capable of handling 1,300 yards of dirt in a day, and hauled to the point needed by trains of flat-cars, carrying about 240 yards to a train. There is now about 4¼ miles of main track laid, extending to the crossing of Benard Creek, at B. J. This bridge is finished and ready for the track to be laid. The bridge is 180 feet in length. Considerable difficulty was experienced in getting a foundation, and some of the piles were driven to a depth of 90 feet below water.

Beyond B. J. the clearing is done and the grading well advanced to a point 10 miles from Greytown. The materials for all of this and 7 miles more are all on hand, except a portion of the ties. In addition there are 1½ miles of side track laid and a considerable amount of working track.

The road is well equipped for construction work, having two powerful locomotives, one weighing 36 tons and one 44 tons, and a heavier and still more powerful one is now on the way here. We have in use fifty cars of various kinds, one steam shovel, a ballast unloader, lifting jacks and all appliances necessary.

At the terminus of the railroad a fine wharf, 30 by 264 feet, has been built, all the timber for which was creosoted in the best possible manner. This wharf is thoroughly protected by fender piles and wales, and is built to sustain any load which may come upon it. It is provided with a derrick and steam-hoisting engine, and has a railroad track laid on it so that materials may be loaded directly from the lighters on the cars by steam. Over 100 feet of this wharf is in 12 to 14 feet of water.

A breakwater for the protection of the entrance to the harbor, now being constructed at the eastern terminus of the canal, was begun in December, 1889, and has already been built out a distance of 715 feet into the sea, and is now being continued and will be carried out to a distance of 1,900 feet.

The breakwater is 42 feet in width, and is constructed by driving piles in bents 8 feet apart, each bent having twelve piles capped with a 14 by 14 inch timber drift-bolted to top of four piles, on which it rests, and firmly secured to the remaining eight piles in the bent with screw bolts. On top of the caps, and firmly bolted to them, there are eight stringers of 12 by 12 inch timber, running lengthwise of the pier. Each bent is thoroughly braced transversely by six diagonal pieces of 4 by 10 inch timber spiked to the opposite side of the piles. Along each side of the pier piles are put in between the bents as closely as they can be driven, thus forming a solid wall of piles along each side of the pier. The spaces between the rows of piles running lengthwise of the pier are filled with brush mattresses, about 2 feet in thickness, which are sunk into position by being loaded with rock. Alternate layers of brush and rock are being put on until an elevation above high water is reached. As this is being filled in, the waves bring sand and deposit it so that the whole space is thoroughly filled with a composite mass of brush, rock, and sand, through which it is impossible for worms to penetrate, and by its weight making a structure of great strength and stability. To insure the greatest durability, none but creosote timber, containing 16 pounds of oil to the cubic foot of timber, is now being used.

For the purpose of handling materials economically, a standard gauge railroad track has been laid as fast as the work progressed, and a substantial railroad built from the pier to deep water in the lagoon, a distance of a quarter of a mile. This road crosses two arms of the lagoon on substantial pile bridges, and at the terminus has a wharf with a derrick for discharging materials which are brought from the main land in lighters. There has also been built a wharf 20 by 30 feet, with storage bins, for the reception of coals.

As the pier advanced the waves were deflected, so that they began to cut in behind the breakwater and threatened to cut the buildings off from the pier. To prevent this a wing wall of sheet piling has been driven along the channel from the pier to the open lagoon, a distance of 700 feet, effectually preventing any further tendency to cut away the beach. The bottom of the sea beach here is very hard sand, through which it would have been almost impossible to drive piles by the ordinary method; this became evident soon after starting the work, and the experiment of sinking them

with a water jet was tried; this proved eminently successful, affording a quick and economical solution of the problem. As the pier advanced the sand was filled in on the east side, so that there is now solid land out nearly the entire length of the breakwater, adding greatly to the strength and safety of the structure. On the west side there was a bench 100 feet in width and 6 feet in height; this the sea has cut through, giving an opening of about 600 feet in width and a channel with 6½ feet of water at low tide, through which all the lightering to and from the vessels has for months been done. This opening and maintaining of a channel, without dredging, is the best possible proof of the final success of the plan adopted for the formation of a harbor.

The bar in front of the San Juan lagoon has long been known as one of the most dangerous places on the coast in rough weather, and it is with no small satisfaction that I say the breakwater has been carried forward through the heavy surf, which prevails here during several months of the year, without even stopping on account of weather, and without an accident of any kind, or the loss of a life. The dredging plant, purchased of the American Dredging Company, consisting of several dredges, steam tugs, lighters, contents of a machine shop, etc., have begun to arrive, there being already five dredges, nine lighters, and several hundred tons of machinery and supplies delivered here. The dredges are being put in order as fast as possible, one being already at work cutting a channel across the bar to deep water outside.

A contract has been let to the North American Dredging and Improvement Company of New York for dredging 1,500,000 cubic yards in the proposed harbor at the eastern terminus. This company has now one dredge and a large scow, and a large plant of dredgers, scows, and tugs now on their way here.

A contract for clearing the right of way from Lake Nicaragua to the Pacific has been let, and work will soon begin on this portion. A large amount of supplies, tools, and machinery, consisting of steam boilers, rock drills, hoisting engines, railway appliances of all kinds, etc., are now on hand and ready for work.

In all the work done the aim has been to have everything first class, and no expense has been spared to secure this end. In many cases inferior material might have been used at a great saving of first cost, but this has not been done.

All the timber of the breakwater, the railroad wharf, and permanent bridges, is creosoted in the best possible manner. Creosoted railroad ties are being brought from the United States at a cost of about four times what ties of native wood could be bought for. The capacity of the creosoting works to its utmost.

All the employés, both officers and laborers, are housed and fed by the company. It would undoubtedly seem to be cheaper not to do this, but laborers would not receive as good food nor as comfortable lodging, and sickness would be the result.

At an early date an excellent hospital was established, where all the company's employés are treated free of cost. This, in connection with the care taken of the employés, has kept the sick list down to a point which would be considered excellent in any climate. The death rate among laborers has been remarkably small, and there has not been a death among the officers from sickness.

In conclusion, I would call attention to the great difficulty under which the work has been done.

In times past it was no uncommon thing for vessels laden with only ordinary packages of merchandise to leave here without discharging their cargoes on account of the unprotected anchorage. We have been compelled to unload locomotives, steam shovels, pile-drivers, railroad cars, etc., in packages weighing as high as 15 tons, receiving them on board lighters in an entirely unprotected sea 2 miles from land, and bringing them ashore, where they have been taken from the lighters and set up without the aid of powerful derricks, such as are commonly used for such work.

The country along our line was entirely without highways, or any means of communication. From the small settlement of San Juan del Norte to Ochoa the country was an unknown and uninhabited wilderness.

The company has gone to work in an unostentatious, systematic manner to accomplish the great work before them, and may well take pride in what has been accomplished.

Very respectfully,

FRANK P. DAVIS,
Division Engineer.

A. G. MENOCAL, Esq.,
Chief Engineer, Nicaragua Canal
Construction Company, America, Nicaragua.

SUMMARY OF HOSPITAL SERVICE.

NICARAGUA CANAL CONSTRUCTION COMPANY,
San Juan del Norte, Nicaragua, November 1, 1890.

The work first undertaken by the above company was simple surveying, carried on by small parties of engineers, who were constantly changing the location of their camps. During this period there was no regular organization of the medical department, and no hospital service. The health of the limited number of officers and men was cared for by three assistant surgeons, who traveled back and forth between the different camps in their different sections.

In the summer of 1889, much of the preliminary work having been completed, the number of employés was considerably increased, and the work more concentrated at several points, so that it became possible to inaugurate a hospital service.

At Greytown the hospitals of the company are located on the beach, about three miles from the town, and two medical stations have been erected on the San Juanillo and Deseado rivers. At the hospital two surgeons were employed, and also one in each station.

It has been the policy of this company to increase the hospital accommodations and number of the surgical staff as rapidly as was found necessary, either by the increase of the number of employés at work or from the possible increase of the percentage of sickness. A style of buildings has been adopted, which being made with corrugated iron sides and roofs, are practically exempt from danger by fire, and less liable than wooden buildings to become infected.

At present the company has at work about 2,000 men, and through the medical department furnishes the following accommodations:

(1) *Headquarters hospital* (on the beach at Greytown).—This hospital consists of three main buildings and nine smaller ones, as shown by the accompanying ground plan. No. 1 is occupied by the chief surgeon's office, the hospital office, and living quarters for the house surgeon and his assistant surgeons, the druggist, and chief surgeon's clerk. No. 2 has an operating room, arranged for antiseptic operations, and used solely for such cases; an examining room for the treatment of out patients, and examination of those desiring admittance to the hospital, etc.; a pharmacy, well stocked, and eight wards for the accommodation of officers and mechanics. Three of these wards are set aside as private rooms for the higher officials, or for cases requiring perfect quiet. No. 3 contains two large wards on each floor; one floor being used for surgical, and the other for medical cases among the laborers. No. 4 is divided into two large dining halls for the convalescent officers and laborers, respectively. No. 5 holds two closets and bath rooms for the use of officers; running water and shower baths being provided. No. 6 is used on the lower floor as a druggist's storeroom, while the upper floor is occupied by sleeping apartments. No. 7 has three rooms, viz., kitchen, steward's storeroom, and pantry. Nos. 8, 9, 10, 11, and 12 are respectively used as a drying house, laundry, barracks, deadhouse, and stables.

The wards throughout the hospital are furnished exactly as those in the best regulated hospitals of New York, while, owing to the mild climate, we have been enabled to provide more perfect ventilation than is possible in our large city hospitals.

A corps of well-trained nurses, under charge of a head nurse, care for the patients night and day, while the kitchen and general work about the buildings are looked after by a competent steward.

A house surgeon, two assistant surgeons, and an assistant druggist are employed here constantly. The capacity of this hospital is 125 beds.

An efficient ambulance service is connected with this hospital.

(2) *Temporary hospital No.* 1 (6 miles up the line of railway now building).—We have erected a building, 20 by 50 feet, for use as a temporary or emergency hospital, the object being to treat here mild cases from among the employés further up the line, and to furnish more immediate relief in cases of accident before forwarding patients to the headquarters hospital.

This building contains 30 beds, a pharmacy, and examining room. One assistant surgeon, an assistant druggist, and two nurses are located here.

(3) *Medical station.*—In addition to the hospital, we have established three medical stations; one in the Deseado Valley, one in the San Francisco Valley, and a third on the western division, in each of which is stationed an assistant surgeon. The duty of these doctors is to visit periodically all camps in the station, and, after treating such mild cases as they may find, to forward those requiring hospital treatment.

(4) *Druggist's department.*—The druggist is stationed at the headquarters hospital, and receives and fills requisitions from the different camps and stations. He also has oversight of the pharmacies of both hospitals. Every camp, irrespective of its size and importance, is kept constantly stocked with a good assortment of the more common household drugs, while each camp, at which a surgeon is stationed, has a good pharmacy.

(5) *Sanitary work.*—It has been the policy of the company to prevent sickness as far as possible, and every surgeon is invested with the authority of a sanitary inspector in his station, and is expected to report every ten days to the chief surgeon as fully upon the sanitary conditions of the different camps, as upon matters more strictly medical.

At Greytown, during the summer months, every vessel arriving at the port is visited by the chief surgeon, or one of his staff, before communication with the shore is allowed.

The health of the employés has been very good. The care exercised by the company in looking after those actually ill has been followed by highly gratifying results. Only 1⅛ per cent. of those actually in the hospital have died, and this percentage includes all cases, whether due to accidents involving sudden death, or deaths from phthisis pulmonalis, contracted before entering the company's service.

Of those admitted to the hospital, suffering from diseases contracted in the country, only two-thirds of one 1 cent. has died. Diseases met with are not, as generally supposed, entirely of a malarial character, for only 51 per cent. of the cases treated during the three months past have been due to fever of any form.

Among the remaining, one finds about the same variety of troubles as in a more temperate climate.

J. EDWARD STUBBERT,
Chief Surgeon.

APPENDIX D.

THE MARITIME SHIP CANAL OF NICARAGUA.

INTEROCEANIC COMMUNICATION.

The question of interocanic communication, across the narrow neck of land which connects the North and South American continents, is one that has commanded attention since the discovery of the Western World. Indeed, it was the first question which that discovery suggested for solution; for this narrow neck of land is the only, but effectual, barrier which interposed to prevent the realization of Columbus's theory that the East Indies might be reached by sailing westward from Europe.

A history of the various attempts made to solve the problem, from the time of Charles V. of Spain until the present, would fill volumes and would be of greatest interest, but is foreign to the purpose of this pamphlet, which is to present as concisely as possible the practical results which thereby have been attained.

On the 15th March, 1872, a Commission, consisting of Brig. Gen. A. A. Humphreys, Chief of Engineers U. S. Army; Prof. C. P. Pattterson, Superintendent U. S. Coast Survey, and Admiral Daniel Ammen, Chief of Bureau of Navigation, was appointed by the President of the United States, in compliance with a resolution of the Senate, to consider the subject of communication by canal between the waters of the Atlantic and Pacific Oceans across, over, or near the isthmus connecting North and South America.

After a long, careful, and minute study of the several surveys of the various routes, and after additional surveys made in connection therewith, especially of the Panama and the Atrato-Napipi routes, the Commission reported February 7, 1876, unanimously, that the route from San Juan del Norte (Greytown) by way of the San Juan River, Lake Nicaragua, and the valleys of the Rio Del Medio and Rio Grande to the port of Brito on the Pacific coast, possesses greater advantages and offers fewer difficulties than any of the other routes shown to be practicable.

The different routes, surveys for which had been conducted through a series of years by naval officers under the instructions of the Navy Department, at this time considered and reported upon by the Commission, were as follows:

Named geographically from North toward the South the routes considered were:

1. The Isthmus of Tehuantepec.
2. The Nicaragua route via Lake Nicaragua.
3. The Isthmus of Panama.
4. The San Blas and Chepo route.
5. The Caledonia Bay and Morti routes.
6. The Caledonia Bay and Sucubti route.
7. The so-called "Du Puydt" route.
8. The Cacarica and Tuyra route.
9. The Atrato and Fernando route.
10. The Atrato-Napipi route.

Of the numerous projects for interoceanic communication by canal many had been proven impracticable and these only were deemed worthy of consideration. Exactly how many different routes had been proposed in 1876 can not be stated, but Admiral Davis in his work published in 1866 names nineteen as then suggested.

At the International Congress, convened in Paris in the year 1879 to determine the location of an interoceanic canal across the American Isthmus, the merits of the Nicaraguan route were ably advocated by the delegates from the United States Government, Admiral Daniel Ammen and Civil Engineer Menocal, and by other engineers of high repute. The correctness of the arguments then made in favor of this route, as well as of the report of the commission already mentioned has, since that time, been practically demonstrated. The only reason for the adoption of the Panama route by the congress was that it was believed that a sea-level canal could be there constructed. The abandonment of the sea-level theory, and the adoption of locks in 1887 has proven the fallacy of the theory.

CONCESSIONS AND ORGANIZATION.

In April, 1887, the Nicaragua Canal Association secured from the Government of Nicaragua a concession granting exclusive privilege to excavate and operate a maritime ship canal across its territory, from the Atlantic to the Pacific Ocean, for the unobstructed and commodious passage of vessels of the same size as the large steamers used for ocean navigation in Europe and America, with all privileges necessary to the advantageous and efficient prosecution of the work.

In pursuance of the conditions of the concession, surveys were commenced in December, 1887, and were continued by a numerous and competent corps of engineers until the final location of the route was determined. These surveys have been carefully examined and approved by a board of consulting engineers, and by the Nicaraguan Government, and they are the basis of all work done since the organization of the company of execution.

In February, 1889, the Congress of the United States granted to Frederick Billings and his associates, as incorporators, a charter under the name of The Maritime Canal Company of Nicaragua, with a capital of $100,000,000, and the right and authority to increase the same to $200,000,000.

In May, 1889, the incorporators organized under the provisions of their charter, and on the 25th of that month dispatched to San Juan del Norte, by the steamer *Alvena*, the first expedition for construction.

On the 3d day of June, 1889, the company began the preliminary work of construction at San Juan del Norte (Greytown).

On the 8th day of October following it commenced the work of excavation, and the Government of Nicaragua has officially recognized and declared by decree that the construction of the canal was formally commenced, in accordance with the terms of the concession, on the said 8th day of October, 1889.

WORK ACCOMPLISHED.

Since the 3d of June, 1889, the company has established permanent headquarters at San Juan del Norte, erected large storehouses, hospitals, dwellings, and other buildings. It has accumulated there several miles of piping and other material for the construction of an aqueduct to supply the lower portion of the canal and the harbor with pure fresh water. It has cleared of obstructions to navigation parts of the San Juanillo, the Deseado, the San Francisco, and other navigable streams. It has built over a mile of broad-gauge railroad, constructed over 70 miles of telegraph and telephone lines, and cleared several miles of the route of the canal between the harbor and the first lock in readiness for dredging. It has landed at San Juan del Norte large quantities of machinery, tools, lumber, piles, creosoted timber, boats, steam launches, lighters, and other material and equipment necessary in the work of restoring the harbor and for use in construction.

The important work of building the breakwater, to protect the harbor entrance from the effects of shifting sand on the coast, was commenced about the middle of December. The breakwater is now built out 600 feet, with a width of 40 feet, and the depth of water reached is about 15 feet. The result thus far attained by this work is most satisfactory, even exceeding the promises of the chief engineer in its effect upon the deposit of sand and upon the action of the ocean on the protected area.

DESCRIPTION OF COUNTRY.

The Republic of Nicaragua occupies a part of the American isthmus extending from about 10° 70′ N. to 15° N. latitude and from 83° 20′ W. to 87° 40′ W. longitude.

Its shores were first seen by Europeans in 1503, when Columbus in his fourth voyage rounded the cape at its northeast angle, which he called Cape Gracias á Dios, the name it bears to-day, and then coasted south along its entire eastern shore. In 1522 Gil Gonzales d'Avila discovered its Pacific coast, and penetrated to the lakes and to the cities of its Indian inhabitants. Previous to this the country was undoubtedly occupied by a numerous population of Aztecs, or nearly allied people, as numerous specimens of pottery, gold images, and implements found about the lakes and their islands seem to demonstrate.

In 1529 the connection of the lakes with the Caribbean Sea via the River San Juan was discovered, and during the last quarter of that century considerable commerce was carried on by this route between Granada and other ports of Lake Nicaragua and the cities of Nombre de Dios, Carthagena, Havana, and Cadiz.

In 1823, Nicaragua with her sister colonies, threw off the rule of Spain and formed a confederation; this confederation was dissolved in 1839, and since then Nicaragua has conducted her own affairs.

In shape, Nicaragua is an irregular quadrilateral. Its longest side extends from the Gulf of Fonseca northeasterly to Cape Gracias á Dios., 290 miles. From Cape Gracias á Dios south to the month of the Rio San Juan, the Caribbean coast line is 250 miles long; thence nearly due west across the Isthmus to Salinas Bay, on the Pacific, is 120 miles. The Pacific coast line, extending northwest, is 160 miles long. The area of the country is 51,600 square miles. In point of size it stands first among the Central American Republics. It is larger than either the State of New York or the State of Pennsylvania; it is about the size of Denmark, Belgium, the Netherlands, and Switzerland, combined; and is one-fourth as large as France or Germany. Its population is about 400,000.

The principal cities are—

	Inhabitants.
Leon	30,000
Granada	12,000
Managua	10,000
Rivas	8,000
Massaya	14,000

The Gulf of Fonseca and Salinas Bay, at the northwest and the southeast points of the Pacific coast of Nicaragua, are two of the finest and largest harbors on the entire Pacific coast of Central America. About midway between them is another fine harbor, that of Corinto; and at various places along the coast, at Tamarindito, Brito, and San Juan del Sur, are good anchorages, secure in all except heavy southwest gales. On the Caribbean coast there are no natural harbors suitable for large vessels, but there are numerous lagoons, bights, and river mouths, affording the best of shelter for coasting vessels and steamers.

The central portion of Nicaragua, from north to south, is occupied by the main Cordillera of the isthmus, which is here greatly reduced in altitude and consists of a confused mass of peaks and ridges with an average elevation of scarcely more than 1,000 feet.

Between this mountainous region and the shore of the Caribbean Sea stretches a low, level country covered with dense forests and drained by several large rivers.

West of the mountain zone is a broad valley extending from the Gulf of Fonseca, southeasterly, to the boundary of Costa Rica—in this valley are located the two lakes, Managua and Nicaragua. The latter, over 100 miles long and from 30 to 60 miles wide, is worthy of being called an inland sea; Lake Managua, which flows into it from the northwest, through the river Tipitapa, is 30 miles long and about 20 miles wide.

Between these lakes and the Pacific is a narrow strip of land from 30 to 12 miles in width, stretching from the magnificent plain which surrounds the cathedral city of Leon, in the north, to the rolling fields of indigo and maize and the cacao plantations which environ the garden city of Rivas, in the south. The beauty, fertility, and salubrity of this region is the theme of universal praise; its undulating surface becomes hilly near the Pacific and within a few miles of the ocean breaks into the coast range, from 500 to 1,200 feet in height. Looking from the summit of one of the western hills the garden of Central America, containing the city of Rivas and half a dozen small towns and villages bowered in orange groves and palms and surroundedby plantations of sugar, indigo, and cacao, lies spread below.

The drainage of the lakes and of all this region passes down the Rio San Juan and discharges into the Caribbean Sea at San Juan del Norte, the southeast limit of the country. On the western shore of Lake Nicaragua nearly opposite the head of the San Juan is the lowest pass across the backbone of the New World, from the Arctic Ocean to the Straits of Magellan.

CLIMATE.

In its climatic features Nicaragua is exceptionally favored. Lying between the elevated mountain masses of Costa Rica on the south and of Honduras on the north, the average elevation of its own mountains is hardly 1,000 feet; it is thus the natural thoroughfare of the northeast "Trades," which rush in from the Caribbean Sea, sweep across the eastern slopes, break the surface of its lake into sparkling waves and then disappear over the western hills, aërating, cooling, and purifying the entire country, destroying all germs of disease, and making Nicaragua the healthiest region in Central America.

On the Atlantic slope rains are frequent, but by the time the wind reaches the lake basin its surplus moisture is gone, and as the drier land raises its temperature it absorbs instead of depositing moisture. Hence a difference in climate between the east and west sides of the country, the latter being, in the dry season, from November to May, almost without rain. Squier says of this season:

"The temperature is less, the nights positively cool and the winds occasionally

chilling. The sky is cloudless and trifling showers fall at rare intervals. * * * This season is esteemed the healthiest of the year. Its effect is practically that of a northern winter."

The temperature of Nicaragua is equable. The extreme variation recorded by Childs was 23°; observed near the head of the San Juan in May, 1851. It may be said in general terms, that the temperature rarely rises above 90° Fahr. or falls below 70° Fahr. The average temperature, as observed by the latest surveying party on the San Juan River, was 73° at 6:30 a. m., and 82° at 2 p. m. The equatorial cloud belt, following the sun north in spring, is late in reaching Nicaragua, and the wet season is shorter than in regions farther south. The average rainfall west of the lakes for nine years was about 64½ inches. On the Caribbean coast it is greater.

The scenery of the eastern portion of Nicaragua is of the luxuriance peculiar to all tropical countries. In the vicinity of the lakes and between them and the Pacific, the isolated mountain peaks which bound the plain of Leon on the northeast, the mountain island of Ometepe and Madera, in Lake Nicaragua, the towering masses of the Casta Rican volcanos and the distant blue mountains of Segovia and Matagalpa seen across the sparkling waters of the lakes, charm the eye with scenic beauties unsurpassed in grandeur, variety, and richness of coloring in any other country.

PRODUCTS.

The products of Nicaragua are numerous and valuable, although the resources of the country are as yet almost entirely undeveloped. In the hilly region of the northwest coffee is grown in large quantities. Brazil wood grows in abundance in the forests, and plantations of sugar, indigo, and cacao abound everywhere between the lakes and the Pacific. Potatoes and maize thrive in the uplands of Segovia. The Chontales region, east of the lake, is a grazing country supporting thousands of cattle Farther east are the gold and silver mining districts of La Libertad, Juigalpa, and others not so well known. The dense forests which cover portions of the country are rich in rubber, cedar, mahogany, and dye woods, and trees and plants, too numerous to mention, of medical and commercial value.

All tropical fruits grow in abundance, and the rich banks of the rivers of the eastern slopes will yield almost incalculable harvests of plantains, bananas, oranges, pineapples, and limes.

Game of numerous varieties—deer, wild hog, manatee, tapir, wild turkey, ducks, quail, etc.—is plentiful in the forests, and fish abound in the rivers.

LOCATION OF ROUTE.

It is through this country, salubrious, fertile, beautiful, and rich in natural resources that the Maritime Canal of Nicaragua is to be constructed. Its route, as determined by surveys, accepted and approved by the Nicaraguan Government, traverses the lowest depression of land in the Cordillera, between the Arctic Ocean and Cape Horn. The depression is occupied by the large inland sea of fresh water, Lake Nicaragua, and by its outlet, the San Juan River. The western border of the lake is within 12 miles of the Pacific coast, from which it is separated by a low divide of 42 feet. Its surface is 110 feet above sea level. Its drainage is toward the Atlantic, through the San Juan River into the Caribbean Sea. These great natural features are to be utilized in the proposed canal. The lake is 100 miles long, has an average width of 45 miles and a variable depth, reaching in some places 150 feet. The San Juan River is already navigable for river and lake craft throughout most of its length.

WORK PROPOSED.

The details of work as proposed are briefly, a breakwater at San Juan del Norte and the deepening of the harbor, dredging thence to the westward 9¼ miles through alluvial ground; then a lock of 30 feet lift. At 1¼ miles beyond there will be a second lock of 31 feet lift, and a dam across the small stream Deseado, above which will be two basins, separated by another dam and a third lock of 45 feet lift, affording 5 miles of free navigation; then a rock cut about 2¾ miles in length, followed by 12 miles of free navigation in the valleys of two small rivers, the San Francisco and the Machado. Here the water will be raised by dams and embankments, forming basins which will connect directly with the San Juan above a large dam across that river, which will raise the surface level in the river and lake and secure additional free navigation of 64½ miles in the river and 56½ miles across the lake. On the western side of the lake the canal enters a cut of slight depth, in earth and rock, 9 miles long, issuing thence into the Tola basin, with 5½ miles of free navigation obtained by damming the small stream, the Rio Grande. At this dam a series of locks lowers the level 85 feet, and the canal proceeds in ex-

cavation down the valley of the Rio Grande, a distance of 2 miles, to the last lock, a tidal lock of 20 to 30 feet lift, below which the canal enters the upper portion of the Harbor of Brito, 1½ miles from the Pacific Ocean, where a breakwater will be constructed, enlarging and making more commodious the present harbor.

GENERAL FEATURES OF WORK.

The general features of the work as determined by the surveys and studies previously referred to are as follows:

	East side.	West side.	Total.
	Miles.	*Miles.*	*Miles.*
Sea-level canal, dredged in earth, from the coast	9.297	0.57	9.867
Rock thorough cuts, with or without earth on top	2.833	6.41	9.243
Earth thorough cuts, no rock	2.146	2.42	4.566
Earth with layer of rock at bottom	.354	2.00	2.354
Total cutting, apart from locks	14.630	11.40	26.030
Locks, three on each side	.379	.380	.759
Natural surfaces, flooded to 30 feet depth or over, requiring neither dredging nor excavation	13.649	4.53	18.179
Flooded surfaces, requiring earth dredging only to make 30 feet depth of water	2.70	.74	3.440
Channels in lake and river requiring excavation under water	35.00	2.28	37.280
Natural courses or artificial basins having 30 feet or over of water and requiring neither dredging nor excavation	43.67	40 09	83.760
Total route from ocean to ocean	.....	.....	169.448

SUMMARIES.

	Miles.
Natural and artificial water ways, needing neither dredging nor excavation	101.939
Canal proper, thorough cuts	26.030
Excavation below surface of water to give 30 feet depth of water, chiefly earth	40.720
Six locks	.759
Total route from ocean to ocean	169.448

	East side.	West side.	Total.
	Miles.	*Miles.*	*Miles.*
Navigation in canal and locks	15.009	11.780	26.789
Free navigation in basins	.....	.....	21.619
Free navigation in river San Juan	.....	.....	64.54
Free navigation in Lake Nicaragua	.....	.....	56.50
Total route from ocean to ocean	.....	.....	169.448

The entire route has been carefully located and cross-sectioned and the computed quantities of excavations, fills, and embankments as determined by these studies are as given below. Borings by rock drills, to the depth of necessary cuttings, have been made throughout the entire length of the divide cuts, and the material is everywhere found to be of rock that will hold well the slopes proposed.

Quantities.

	Cubic yards.
Earth dredging for canal, all below sea level	29,823,161
Earth excavation, all above sea level	21,773,810
Rock excavation	13,452,938
Rock excavation, under water	575,445
Total excavation, earth and rock	65,625,354
Rock fills, for dams and breakwater taken from divide cuts	4,033,810
Earth fills, taken from excavations	6,105,380
Concrete	615,651
Stone pitching	202,641

It is estimated that construction can be completed and the canal ready for operation by 1897.

The minimum depth of water throughout the canal will be 30 feet.

With the exception of the rock cuts in the eastern and western divides, excavation will be at all points wide enough for two ships to travel in opposite directions. Through the basins and in the lake and river San Juan vessels can pass each other and navigate with entire freedom.

CAPACITY FOR TRAFFIC.

The capacity of the canal for traffic will be limited only by the time required to pass a lock. On the basis of 45 minutes as the time consumed in the operation and that but one vessel will pass in each lockage, the number of vessels which may pass through the canal in one day is calculated at 32, or, in one year, 11,680; which, based on the average tonnage of vessels going through the Suez Canal, will give an annual capacity for traffic of over 20,000,000 tons, but the locks are 650 feet long and 70 feet wide in the chamber, and two vessels, each of 2,000 tons displacement, may be passed through on each lockage, thus largely increasing, if not doubling, the estimated capacity. The present traffic of the Suez Canal is about 7,000,000 tons per annum, with a transit of about 3,500 vessels.

The lowest flow of the lake in the dry season is 11,390 cubic feet per second. Its average discharge is 14,724 cubic feet per second, or in one day 1,272,530,600 cubic feet. The water required for 32 lockages in one day is 127,400,000 cubic feet; consequently the lake supply alone is ten times the maximum needed for the operations of the canal.

The time consumed in passing from ocean to ocean, by steamers, is estimated at twenty-eight hours, which includes one hour and twenty minutes for possible detentions in narrow cuts.

That the capacity of the canal, and the sufficiency of the supply of water for lockage, are fully adequate to any demands likely to be made by commerce for some time to come is evident. In this connection some estimate of the probable business of the canal is proper. The great increase of navigation by steam during the past twenty years is an important factor in this problem. The substitution of steam for sail since 1870 is indicated in the following tables:

Shipping tonnage of the world.

Year.	Sail.	Per cent.	Steam.	Per cent.
1870	13, 868, 000	88	1, 918, 000	12
1881	15, 002, 000	72½	5, 644, 000	27½
1888	9, 497, 000	45	11, 552, 000	55

This, nowever, is not a proper indication of the comparative increase for, owing to the greater speed of steamers as compared with sailing vessels, their capacity for transportation is multiplied five fold, and the comparison by percentages then appears as follows:

	1870.	1881.	1888.
	Per cent.	*Per cent.*	*Per cent.*
Sail transportation	59	34½	14
Steam transportation	41	65½	86

This enormous change is illustrated, as well as anywhere, in the growth of tonnage passing though the Suez Canal in the same years:

	1871.	1881.	1888.
Number of vessels	765	2, 727	3, 440
Tonnage	761, 467	4, 136, 779	6, 640, 834

These figures are indicative of the eagerness with which commerce avails itself of every facility that expedites the movement of commodities and shortens the time of transportation, whether it be by rapidity of locomotion or by lessening of distances, thereby lessening its cost They also indicate the wonderful growth of commerce under favoring circumstances.

Under such circumstances the commerce of the world, as indicated in the first table, has increased threefold in eighteen years. The effective tonnage, allowing fivefold for steam, was—

	Tons.
1870	23,458,000
1881	43,222,000
1888	67,257,000

If it increases in the same ratio for the next seven years in which it advanced between 1881 and 1888, it will in 1895 amount to 105,000,000 tons.

TONNAGE TRIBUTARY TO THE CANAL.

From statistical records it appears that the number of ships trading from our Eastern ports and from Europe to the North and South Pacific was, in 1879, 2,647, with an aggregate tonnage of 2,671,886 tons.

Eight years later, in 1887, statistics show the following facts:

	Tons.
Trade across the Isthmus of Panama	1,217,685
Trade between Atlantic and Pacific ports of the United States	145,713
Trade between Atlantic ports of the United States and foreign countries west of Cape Horn	752,585
Trade between Pacific ports of the United States and foreign countries east of Cape Horn	879,844
Trade around Cape Horn of European countries (Austria, Denmark, Norway, Sweden, and Russia, not included, as statistics are not accessible).	1,471,399
Trade of British Columbia with Europe	39,818
	4,507,044

Excepting the trade across the Isthmus, this is all trade around Cape Horn. No estimate is made of the trade around Cape Good Hope, much of which would seek the canal if it were open ; nor is any estimate made of the trade which, rather than break bulk for transport by the transcontinental railways, would continue on shipboard when the question of the long voyage around either cape had resolved itself into that of a passage through the canal.

These statistics show that the traffic which would naturally seek the canal was, in 1879, 2,671,886 tons, and that it had increased in 1887 to 4,507,044 tons, the percentage of increase being nearly 69 per cent. A similar increase in the next eight years would make it in 1895, 7,616,904 tons. And there is no reason why such an increase should not be realized; in fact, every reason exists to expect it; the industrial development of our Pacific States, the settlement of Alaska, the growing importance of Chili, and, not least of all, the evident disposition of the enterprising and wealthy Empire of Japan to become a dealer in the markets of the world, assure it.

In the foregoing estimates no account whatever is taken of vast sources of traffic, such as ores and timber, of which practically there is nothing carried now, but which will furnish an enormous tonnage as soon as facilities for transportation are provided.

The natural growth and development of the Pacific States and Territories will furnish thousands of tons of traffic to the canal for the hundreds that exist under present conditions. The lumber trade of Oregon and Washington presents the most notable development of any line of commerce that can be cited. In 1886 the total shipment was 6,000,000 cubic feet; in 1887 it amounted to 48,000,000 feet; the amount cut in 1888 is estimated at 706,985,000 feet, and its value at $7,750,000. The shipments abroad of lumber from Puget Sound were valued at over $5,000,000. It is estimated that the forests of Washington contain not less than 175,000,000,000 feet of uncut yellow and red fir, and the timber field of Oregon is 25,000 square miles, a quarter of the superficial area of the State. William H. Seward said: "The entire region of Oregon, Washington Territory, British Columbia, and Alaska seems destined to become a shipyard for the supply of all nations." Lumbermen in Washington estimate that the opening of the Nicaragua Canal will add $2 to the value of every thousand feet of lumber standing around Puget Sound, and the same is true of the still larger timber fields of the Alaskan Archipelago, the estimate being based on cheap transportation, for the cost of ocean transportation as compared to railroad is as 1½ to 10.

The wheat, lumber, fish, wool, furs, and other commodities of the Pacific Northwest will be provided to commerce in increasing quantities and with greater profit to producers when cheap water transportation is at hand to convey them promptly to the world's markets.

The trade between Australia and our Atlantic ports has quadrupled since 1885, though it is still trifling in comparison with the total foreign commerce of those colonies, but it has grown to what it is without encouragement and in spite of obstacles and disadvantages, and favoring circumstances would open up for us large possibilities with this young and vigorous English-speaking people, whose foreign commerce already exceeds $600,000,000 per year.

The total tonnage entered and cleared at New Zealand ports in 1885, exclusive of coasters, was 1,032,700 tons, mostly by sail to Europe.

The distance from Auckland, New Zealand, to Liverpool is 1,100 miles less by Nicaragua than by any other route. From Melbourne it is 400 miles less, and from Sydney 500 miles less, with more favorable weather and winds and currents.

From Yokohama the saving is 3,900 miles and over.*

A London journal says: "In estimating the future before a waterway connecting the Pacific and Atlantic, it must be remembered that India has now 7,250,000 tons of shipping annually clearing from her ports, Australasia, 16,000,000, Hong Kong, 7,000,000, and the Straits Settlements, 7,000,000, most of which comes to Great Britain, and a very large part of which would find its way through the Nicaragua Canal, but incalculable as the advantages would be to this country (Great Britain), it is probable that the United States would benefit to a still greater extent. That this is so is clear from the fact that the greater part of the huge commerce of that country would be saved, through using the canal, sometimes between 5,000 to 12,000 miles of travel." But economy of time and distance is not the only thing deemed of consequence by commerce.

Breaking bulk in transit is also a cost to be eliminated if possible. Manchester is to-day building, at a cost of $35,000,000, a ship canal 35 miles long to the estuary of the Mersey, when Liverpool, her natural port, is only 31½ miles distant by rail, in order to avoid making and breaking bulk away from home and that she may save to her merchants some part of the charges and commissions paid to Liverpool shipping agents.

COASTING TRADE OF THE UNITED STATES.

One most important feature is yet to be mentioned. The opening of the canal will practically make our coast line continuous from Maine to Alaska, and our coasting trade will thereby receive an impetus that can hardly be overestimated. It already amounts to over 500,000 tons per annum between our Atlantic and Gulf ports and Central America and Colombia. Galveston, New Orleans, Mobile, Pearl River, Pensacola, Savannah, Brunswick, Beaufort, Wilmington, Norfork, Baltimore, Philadelphia, New York, and Boston are all interested in the total.

Steamers built for the purpose trade along the shores of the Caribbean Sea, exchanging our articles of commerce for the products of the tropics; but the best harbors and the richest districts and most valuable products of these neighbors of ours are on the Pacific side, where our vessels can not reach them, so they fall to the British and other steamers that ply on the west coast, and the trade goes to Europe.

When the opening of the canal shall have enabled the little steamers and coasting schooners to push through to the Pacific side and compete for its rich trade, with the advantage of home ports and markets thousands of miles nearer than those of Europe, it will not be long before our coasting trade shall have grown to many times its present volume. These are conditions which will tend to make San Francisco, on the Pacific and New York on the Atlantic the markets of the world, and the United States, situated as it is between the two oceans, with practically an endless coast line, the mistress of its commerce.

To this possibility the geographical location and natural features of the Nicaragua Canal are most advantageous, and Lake Nicaragua—the summit level of the canal, a mighty body of fresh water 100 miles in length by 45 in width, deepening to 150 feet, swept continually by the trade winds, with a delightful and healthy climate—gives to the route a political and international importance unique and significant. The nation that controls this canal under terms of amity with Nicaragua will here find rest and refreshment for its fleets and a *point d'appui* from which either ocean may readily be reached in case of need.

To this sheltered stronghold its squadrons, after service done on either ocean, at the bidding of a telegraphic sign from the home Government may return to refit and rest in absolute security until some renewed need of action calls again for their services. There can not be imagined a more potent means of avoiding difficulty than such efficient preparation in advance to quiet promptly any disturbances which may arise.

Placed thus advantageously, one fleet would readily do the work of two, and with

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* See Appendix A.

a naval depot thus conveniently located, the Pacific Coast and our Alaskan possessions, as well as our commerce on both oceans, would be as well guarded as our Atlantic Coast.

This, however, is merely incidental to the canal as an American enterprise and a reason outside of financial considerations why it should command American support.

THE GATEWAYS OF COMMERCE.

When the Nicaragua Canal is built it will stand at the gateways of commerce on the Western Continent, as Suez does in the East, to take toll of more than one-half of the commerce of the world. It needs no argument to demonstrate what that means. The annual reports of the Suez Canal, which possesses far less than a moiety of the natural advantages of the Nicaraguan enterprise, are its best illustration.

We subjoin that portion of the reports since 1879 which has direct bearing upon the subject before us.

Traffic of the maritime canal of Suez.

Year.	No. of ships.	Net tonnage.	Passengers.	Receipts from tolls and passengers.
1879	1,477	2,263,332	84,512	$5,595,247
1880	2,026	3,057,421	101,551	7,501,627
1881	2,727	4,136,779	90,524	9,619,826
1882	3,198	5,074,808	131,068	11,346,345
1883	3,307	5,775,861	119,177	12,350,052
1884	3,284	5,871,500	151,916	12,029,585
1885	3,624	6,335,752	205,951	12,423,354
1886	3,100	5,767,655	171,411	11,297,038
1887	3,137	5,903,024	182,997	11,565,054
1888	3,440	6,640,834	193,895	12,975,315
Expenses of operation, etc., for 1888:				
For administration				307,914
For operation				521,137
For maintenance and renewals				378,007
				1,207,058

The company has not yet published a report for 1889.

From this report is to be seen at a glance the tribute which commerce willingly pays to facilities for its more commodious transaction and its steady and continuous growth under such conditions.

ESTIMATED INCOME.

In view of all the conditions it is not excessive; indeed it is most moderate to expect for the Nicaragua Canal, when it shall be opened to the traffic of the world in 1897, a tonnage of not less than 7,000,000 tons ready for transit. Now, 7,000,000 tons, at $2.50 per ton, a moderate tariff, means a revenue of $17,500,000 per annum.

The operating expenses would for many reasons be less than at Suez, but allowing them to be the same, say, $1,200,000, we may say that the net revenue would pay 5 per cent. on $325,000,000, with the probability of greatly increasing even the selarge figures.

APPENDIX A.

Table showing distances in miles between commercial ports of the world and distances saved by the Nicaragua Canal.

From—	Via Cape Horn.	Via Cape of Good Hope.	Via Nicaragua Canal.	Distance saved.
	Miles.	*Miles.*	*Miles.*	*Miles.*
New York to—				
San Francisco	14,840	.....	4,760	10,080
Bering Strait	16,100	.....	7,882	8,218
Alaska	15,300	.....	6,682	8,618
Acapulco	13,071	.....	3,122	9,949
Mazatlan	13,631	.....	3,682	9,949
Hong-Kong	18,180	15,201	11,038	4,163
Yokohama	17,679	16,190	9,363	6,827
Melbourne	13,502	13,290	10,000	3,290
New Zealand	12,550	14,125	8,680	5,445
Sandwich Islands	14,230	.....	6,388	7,842
Callao	10,689	.....	3,713	6,976
Guayaquil	11,471	.....	3,053	8,418
Valparaiso	9,750	.....	4,700	5,050
New Orleans to—				
San Francisco	15,052	.....	4,047	11,005
Acapulco	13,283	.....	2,409	10,874
Mazatlan	13,843	.....	2,969	10,874
Guayaquil	11,683	.....	2,340	9,343
Callao	10,901	.....	3,000	7,901
Valparaiso	9,962	.....	3,987	5,975
Liverpool to—				
San Francisco	14,690	.....	7,508	7,182
Acapulco	11,921	.....	5,870	7,051
Mazatlan	13,481	.....	6,430	7,051
Melbourne	13,352	13,140	12,748	392
New Zealand	12,400	13,975	11,349	2,626
Hong-Kong	18,030	15,051	13,786	1,265
Yokohama	17,529	16,040	12,111	3,929
Guayaquil	11,321	.....	5,890	5,431
Callao	10,539	.....	6,461	4,078
Valparaiso	9,600	.....	7,448	2,152
Sandwich Islands	14,080	.....	9,136	4,944
Spain to Manilla	16,900	13,951	13,520	431
France to Tonquin	17,750	15,201	13,887	1,314
Hamburg to—	13,931	.....	6,880	7,051
Mazatlan				
Acapulco	13,371	.....	6,320	7,051
Fonseca	11,430	.....	5,530	5,900
Punta Arenas, Costa Rica	11,120	.....	5,515	5,605

From—	To eastern entrance of Nicaragua Canal.	From—	To western entrance of Nicaragua Canal.
	Miles.		*Miles.*
New York	2,021	New Orleans	1,308
Liverpool	4,769	San Francisco	2,578
Hamburg	5,219	Valparaiso	2,518
Amsterdam	4,994	Callao	1,531
Havre	4,874	Portland	3,219
Cadiz	4,220	Victoria	3,428

NOTE.—The distances have been measured by customary routes most convenient for sailing ships and slow freight steamers.

APPENDIX E.

NICARAGUA CANAL.

THE NICARAGUA CANAL PROJECT.

[From Engineering News, September 14, 1889.]

It has been evident for some time to the careful observer that, although the day of small canals is over, the day of great ship canals is just dawning. Heretofore, although there has always been as great proportional need as now for ship canals to shorten sailing distances, yet the means for construction, both mechanical and financial, were so much more limited, and the aggregate volume of traffic to be accommodated so small, that there was not enough traffic "in sight" to pay interest on a cost necessarily far greater than it is to-day.

Accordingly we find that, although ship canals at Suez, Panama, Nicaragua, Corinth, Cape Cod, and elsewhere have been talked about for centuries, yet it is only within the last three decades that the first of them, that at Suez, has really been completed and put to use. At the present moment there are a dozen or so of them in various parts of the world which either are or are likely soon to be under way, as we may show more fully before we close.

This is but the natural effect of the great change of conditions alluded to, and it is important to remember that the end is not yet in this change, great as it is. Capital is so cheap that interest is less than half what it was twenty years ago; engineering appliances are so improved that the cost in labor and time of executing great public works is certainly not more than half what it was twenty years ago; commerce has multiplied with even more marvelous rapidity. The railway mileage of the world has doubled since 1875, or in fourteen years, and that of the United States has doubled since 1877. The shipping has multiplied in the still more marvelous ratio shown in the table below:

Shipping tonnage of the world.

	1820.	1840.	1860.	1870.	1881.	1888.
Sail	3,140,000	4,560,000	9,586,000	13,826,000	15,002,000	9,497,000
Steam	6,000	116,000	820,000	1,918,000	5,644,000	11,552,000
Total	3,146,000	4,676,000	10,406,000	15,576,000	20,646,000	21,049,000
Total effective	3,170,000	5,140,000	13,686,000	20,646,000	43,222,000	67,257,000
Equivalent per cent. per decade.	.....	27.3	63.2	50.9	95.8	88.1

[The "effective" tonnage is ascertained by multiplying the steam tonnage by 5, and adding the product to the sailing tonnage, steamers making about five times as many voyages per year as sailing vessels. The percentages in the last line gives the correct *decennial* ratio regardless of the actual period between the figures.]

It is but natural that great enterprises which lagged along hopelessly in the '40's, '50's, and '60's, should now be begun with confidence, and it is quite certain that enterprises of any promise, which even now are neglected, will not be likely to be neglected long. For example, we can hardly expect the Nicaragua Canal to be opened before 1895, or seven years from 1888. In view of the above accelerating ratio up to 1888, what is the commerce of the world likely to have grown to when it is opened? Obviously it will be vastly larger than it is now, and that is enough for our present purpose; but we should bear in mind also that the commerce tributary to it is the most vigorously growing in the world. Perhaps, however, as giving a

more direct indication of how traffic tends to multiply, we may as well give here the following table of the growth of traffic of the Suez and Sault Ste. Marie canals since they were opened to commerce, the enormous jump in the "Soo" traffic in the last year being especially notable:

Transit through Suez Canal.

Year.	No. of vessels.	Net tonnage.	Receipts from tolls.	Average toll.
1870	486	436, 609	$869, 152	$1. 99
1871	765	761, 467	1, 519, 077	1. 99
1872	1, 082	1, 160, 743	2, 875, 418	2. 47
1873	1, 173	1, 367, 767	4, 170, 145	3. 04
1874	1, 264	1, 631, 650	4, 533, 558	2. 77
1875	1, 494	2, 009, 984	5, 286, 158	2. 64
1876	1, 457	2, 096, 771	5, 526, 292	2. 63
1877	1, 663	2, 351, 447	6, 036, 186	2. 57
1878	1, 593	2, 269, 678	5, 669, 134	2. 49
1879	1, 477	2, 263, 332	5, 426, 223	2. 39
1880	2, 026	3, 057, 421	7, 298, 524	2. 43
1881	2, 727	4, 136, 779	9, 438, 776	2. 28
1882	3, 198	5, 074, 808	11, 086, 208	2. 18
1883	3, 307	5, 775, 861	12, 111, 698	2. 09
1884	3, 284	5, 871, 500	11, 725, 752	2. 00
1885	3, 624	6, 335, 752	12, 011, 452	1. 89
1886	3, 100	5, 767, 655	10, 954, 215	1. 89
1887	3, 137	5, 903, 624	11, 199, 060	1. 89
1888	3, 440	6, 640, 834	12, 607, 524	1. 89

[Receipts are computed at 5 francs per dollar. Net tonnage is about 70 per cent. of the gross tonnage.]

Transit through Sault Ste. Marie Canal.

Year ending—	Days open for navigation.	No. of vessels.	Net tonnage.	Operating expenses.
1881	198	3, 304	1, 802, 571	(*)
1882	229	4, 676	2, 379, 210	$28, 854
1883	216	4, 163	2, 130, 181	35, 510
1884	233	4, 768	2, 540, 799	31, 213
1885	219	5, 629	2, 981, 786	27, 242
1886	222	6, 203	3, 701, 014	25, 401
1887	218	7, 926	4, 882, 802	22, 139
1888	210	8, 823	5, 581, 169	29, 899
1889	.....	8, 832	6, 932, 203	.....

* Not at hand.

[The first Sault Canal was finished in 1855, at a cost of $999,802. The above statistics begin with the opening of the new canal.]

On the other hand, from the accompanying little diagram which we reproduce from our issue of April 27, 1889, it will be seen that the greatest *small* canal in the world by far, in every sense, has been steadily falling off in traffic since 1873, and is now even smaller than it was in 1862, when it was larger than ever before.

We need not seek far for a reason. It lies in the simple fact that the railways have distanced the small canals, not only in speed, but in actual cost of transportation, while they still lag far behind large ships and steamers in economy of transport, and to all appearance must ever do so. The most cursory examination of rates and cost of transportation will reveal this fact. The following table of lake and canal rates is perhaps alone sufficient, remembering that what may be called the standard all-rail rate between Chicago and New York is 30 cents per 100, or a trifle over 0.60 cents per ton per mile, which rate is often severely cut, sometimes by half or two-thirds. As the average cost per ton per mile of the whole United States was just about 0.6 cents (for 109 miles average haul) we may be quite certain that the fair proportional cost of hauling such freight by rail is little if any over 0.3 to 0.4 cents per ton per mile. On the other hand, the ocean rates on grain to Liverpool last year ranged from 2 to 9 cents per bushel of 60 pounds, or a 3,000-mile haul, averaging about 5 cents, or 0.055 cents per ton per mile. At 0.1 cent per ton per mile the steamers feel that they are doing very well, even on flour, which stands about 50 per cent. more per ton than wheat.

Lake and canal rates on wheat.

[Per ton of 2,000 pounds.]

	1885.	1886.	1887.	Average.	Miles.	Per mile.
						Cents.
Chicago to Buffalo, lake	$0.67	$1.22	$1.37	$1.09	925	0.118
Buffalo to New York, canal	1.28	1.67	1.46	1.47	494	0.298
Chicago to New York	1.95	2.96	2.83	2.56	1 413	0.181
Chicago to Oswego	1.05	1.96	2.54	1.85	1,060	0.174
Oswego to New York	1.16	1.52	1.30	1.31	367	0.357
Chicago to New York, via Oswego	2.16	3.47	3.84	3.16	1,427	0.221
Chicago to Montreal	1.97	2.47	2.83	2.42	1,348	0.179

Contrast these figures (all for net tons of 2,000 pounds) with the figures given below of lake and canal rates. We see at once that in a rude way we may classify the lowest feasible rates of freight as follows, with at least relative correctness:

Long haul rates, bulk freights (in cents per ton mile).

Small canals (about)	0.4
Rail (about)	0.3+
Erie canal (about)	0.3—
Lake, 14 to 16 feet draught (about)	0.12
Ocean, 25 feet (about)	0.05+

In evidence of why this difference should exist let us compare one or two items: It has been aptly said, in relation to coal economy in marine steam-engines, that if we assume paper to be as good fuel as coal per ton, we have only to "burn this letter" of one-half ounce weight to propel a ton a mile by steamer—in other words, a ton of 2,000 pounds will produce 64,000 ton-miles of ship and cargo on the ocean at freight speeds. The same is frequently realized by the best lake vessels. To propel one mile a freight-car weighing, with load, 25 tons takes, on an average, over 5 pounds of coal, so that on land a ton of 2,000 pounds only produces 10,000 ton-miles of car and load, or say one-seventh as much. Again, a ship costs only some $50 per ton, a steamer some $100 per ton, and that steamer ton will be good for some 60,000 ton-miles per year, or 600 ton-miles yearly per dollar of capital invested. Were railways equally effective per dollar of investment the 81,000,000,000 ton-miles and passenger-miles made last year in the United States would represent a capital investment of only $135,000,000. They actually represent a capital of $9,607,000,000.

It is needless to go further. The demand of the age being for quick and cheap transportation, we see at once why the day of great ship canals is so visibly dawning. It is dawning, not only for canals, which save great sailing distances, like the Suez and Nicaragua, but also for canals like the Manchester, which save no distance whatever, but merely compete with railways, saving the disadvantage of breaking bulk. That canal is to be 35 miles long, 26 feet deep, 120 feet wide, and to cost, if it uses up all its authorized capital, some $49,000,000. Its actual cost will be at least $35,000,000. Yet Manchester is a city of only 350,000 people, and the tonnage to be benefited by the canal, although as yet largely problematical, is certainly small compared with that which will be tributary to the Nicaragua canal, while the dues must be trifling in comparison.

At least one other canal like the Manchester is likely to be soon started in England: but of course the greatest stimulus to ship canal construction is when more or less sailing distance is also saved, as in the Corinth, North Sea, and Baltic, Cape Cod, and half a dozen others now under way or likely soon to be. And of all canals which ever can be built, it needs only a glance at the map to see that the Nicaragua, or other canal through the Central American Isthmus will save the greatest sailing distances. Even the saving by the Suez Canal is small in comparison.

Thus between London and Canton the Suez saves 3,300 miles (10,000 against 13,300); to Bombay it saves 4,325, and to Calcutta, 3,626 miles, the average saving being about 3,500 miles, while the Nicaragua canal saves from 5,000 to 8,000 miles on most of the voyages likely to be required. Between London and San Francisco it saves nearly 7,200 miles out of a voyage of 14,700; between New York and San Francisco, 10,080

out of a voyage of 14,840; between New York and Canton it is about 500 miles shorter than Suez, and over 5,000 shorter than "around the Horn." As compared with the transcontinental railways it is only some 60 per cent. longer.

The following table will be convenient for reference in this connection. The distances have been measured by routes most convenient for sailing ships and slow freight steamers. The distances for swift mail and passenger steamers have not been calculated:

	Via Cape Horn.	Via Cape of Good Hope.	Via Nicaragua canal.	Distance saved.
New York to—	*Miles.*	*Miles.*	*Miles.*	*Miles.*
San Francisco	14,840	.....	4,760	10,080
Behring Strait	16,100	.....	7,882	8,218
Alaska	15,300	.....	6,682	8,618
Acapulco	13,071	.....	3,122	9,949
Mazatlan	13,631	.....	3,682	9,949
Hong Kong	18,180	15,201	11,038	4,163
Yokohama	17,679	16,190	9,363	6,827
Melbourne	13,502	13,290	10,000	3,290
New Zealand	12,550	14,125	8,680	5,445
Sandwich Islands	14,230	.....	6,388	7,842
Callao	10,689	.....	3,713	6,976
Guayaquil	11,471	.....	3,053	8,418
Valparaiso	9,750	.....	4,700	5,050
New Orleans to—				
San Francisco	15,052	.....	4,047	11,005
Acapulco	13,283	.....	2,409	10,874
Mazatlan	13,843	.....	2,969	10,874
Guayaquil	11,683	.....	2,340	9,343
Callao	10,901	.....	3,000	7,901
Valparaiso	9,962	.....	3,987	5,975
Liverpool to—				
San Francisco	14,690	.....	7,508	7,182
Acapulco	12,921	.....	5,870	7,051
Mazatlan	13,481	.....	6,430	7,051
Melbourne	13,352	13,140	12,748	392
New Zealand	12,400	13,975	11,349	2,626
Hong Kong	18,030	15,051	13,786	1,265
Yokohama	17,529	16,040	12,111	3,929
Guayaquil	11,321	.....	5,890	5,431
Callao	10,539	.....	6,461	4,078
Valparaiso	9,600	.....	7,448	2,152
Sandwich Islands	14,080	.....	9,136	4,944

From—	To eastern end of Nicaragua Canal.	From—	To western end of Nicaragua Canal.
	Miles.		*Miles.*
New York	2,021	San Francisco	2,578
Liverpool	4,769	Valparaiso	2,518
Hamburg	5,219	Callao	1,531
Amsterdam	4,994	Portland	3,219
Havre	4,874	Victoria	3,428
Cadiz	4,220		
New Orleans	1,308		

These are enormous advantages, insuring that the Nicaragua canal can easily collect 50 cents per ton or so more than the Suez, or say $2.50 per ton. At ½ cent per ton per mile this would only pay railway rates for 500 miles, thus in effect reducing the competitive rail distance to 2,500 miles, or as nearly, may be, half that via the canal *free of tolls*. What possible chance have the railways in a competition like this? A moderately fast line of steamers will make the voyage in less than two weeks, and all but express freights will be sure to go that way, and save time as well as money by doing so, while, more important than all, vast sources of traffic, like ores and timber, of which none is now shipped, will furnish a new and heavy traffic. The larger part of the timber supply of the Atlantic coast, for example, is likely to come from the Pacific coast via the canal.

We deem it therefore an entirely safe assumption that the traffic "in sight" is at most not over half what will exist after the canal has been three or four years in

operation. But the traffic "in sight" has been growing rapidly of late years. Estimates, presumably impartial, by the Bureau of Statistics showed as the traffic "in sight:"

Year.	Ships.	Tons.
1879	2,647	2,671,886
1885	4,139	4,252,434

At the present time the most moderate estimates show 6,000,000 to 7,000,000 tons as the probable traffic by 1895. Lesseps claimed 10,000,000 as the minimum for the Panama Canal in late years, but that was certainly extravagant. That it will be attained within much less than ten years after the opening of the Nicaragua Canal, however, we regard as almost a certainty.

Now, even 6,000,000 tons at $2.50 per ton means a revenue of $15,000,000 per year. The operating expenses ought certainly to be much less than at Suez, where they are about $1,000,000, so that we may say that the revenue will pay 6 per cent. on some $250,000,000, and 3 per cent. on $500,000,000, with the probability of greatly increasing even these large figures. It is, therefore, apparent that it really matters little what the canal costs, as respects the expediency of constructing it, unless its cost is to exceed $200,000,000; and let any one with any knowledge of construction look over the profiles and quantities which we publish in this issue, and see where there is reasonable probability of even half that sum being required for construction. The actual cost has been usually estimated at some $60,000,000 to $65,000,000, and we confess we see no reason why those figures *may* not be realized. But we can also see reasons why they may possibly be doubled, and we therefore think the company is eminently wise in not putting before the public at this time any estimate of their own, but simply saying: "Here are the profiles and the quantities; judge of the cost for yourselves."

There will be an inevitable tendency to exaggerate the estimates thus challenged, from remembrance that the $40,000,000 Suez Canal actually cost $100,000,000, and the $120,000,000 Panama Canal cost over $200,000,000 actual and $350,000,000 nominal to prove that it could not be built at all. But as we showed at some length in our issue of July 14, 1888, the conditions at Nicaragua are vastly different from those Panama. We can not again go over in detail all the technical differences, but they are of the first importance. There is no unsolvable Chagres River problem; there is much less canal in excavation; there is much less deep cutting; there is no problem of water supply; there is no rotten, sliding rock; there are no endemic pestilences; three is a stiff trade breeze the year round to maintain health and comfort; there is a prior knowledge from detail surveys of just what is to be done which was wholly lacking at Panama; there is the advantage of all the experience gained at Panama, and of an official "base" on this side of the ocean instead of on the other side; and there is the practical certainty of far better management.

These are enormous advantages, and it therefore seems to us that no reasonable man can doubt, first, that the canal can be built for $100,000,000 to $150,000,000 at the very most, and secondly, that it will be exceedingly profitable even at that rate. If so it is quite immaterial what may be the precise cost of the canal, and the only error to be seriously feared is of *promising* to build the canal for less than really proves necessary, a result which always casts an injurious cloud on an enterprise. But it is not true that carefully made engineers' estimates are not generally safe guides. If any one glances at the top (general) profile on our inset sheet, and sees by the contrast of blue and orange colors how large a proportion of the length of the canal is natural navigation, and how large a proportion of what is left is mere dredging work, involving no uncertainties, he can hardly help deriving a most favorable augury for the success of the enterprise.

We have always felt a regret, and do now, that the Government did not take hold of this enterprise when President Grant negotiated a treaty to that effect and recommended it. Such a canal ought to be a great highway of nations, run not for private profit, but for the profit of a whole nation at least, if not of the whole world. But it was somewhat contrary to our national traditions, although not more than our river and harbor improvements were when they first began, and the opportunity has passed. It is worthy of consideration, however, whether even now a true regard for the public interest would not require that the same end should be attained measurably by a Government guaranty of interest on bonds for construction, in return for certain stipulations as to reduction of rates as traffic increases. If the whole conduct and cost of the enterprise be left to a private company, we do not doubt that they will be able to raise the money, but it will cost them 6 to 8 per cent. instead of the 3 per cent. which a Government guaranty would insure; and the company will

reasonably claim that, having been left to push the enterprise through unaided, they had a right to enjoyment of the profits of their monopoly, however great, although in the beginning they might have been glad to accept the certainty of a moderate profit rather than the chance of a greater one.

Suez proves, however, that such companies prefer to reduce tolls considerably as traffic grows, merely to encourage its greater growth, and perhaps this alone will serve as sufficient check. Whatever be done we are satisfied from all the information we can gather that a few months more will see the main contracts let, the money for construction insured, and the work which is already begun in active progress; and we confidently look forward to seeing its construction prove one of the most honorable achievements of American enterprise, in broad contrast with the fiasco at Panama, which possibly for the moment may be somewhat of an impediment to the company's negotiations.

THE NICARAGUA SHIP CANAL.

[From Engineering News, September 11, 1889.]

(The maps and figures referred to are omitted.)

The work on this canal being now fairly begun, engineers in general will be greatly interested in the large colored sectional profile which accompanies this issue and which gives the first information as yet published of the precise nature of the material on the line, without which, of course, it is quite impossible to form very definite views as to the probable cost of the canal or the sufficiency of estimates.

We comment at some length on another page on the general status and promise of the enterprise as shown by this profile and other accompanying information, and in this article confine ourselves to a presentation of the facts which must form the basis of any opinion in regard to it, so far as they are as yet determined.

We published on July 14, 1888, a general summary of the results of the 1888 surveys, with maps and profiles. We reproduce in this issue three of these maps, with some corrections, viz, a general map of the entire route from ocean to ocean (Fig. 1) and detail maps of the western division (Fig. 2) and of the canal and basin part of the eastern division (Fig. (3). All the rest of the route consists merely of lake and slack-water river navigation.

Our large colored inset sheet shows, first, a general profile (A) of the entire route; and secondly, detail profiles to large scale of (B) the eastern division, Greytown to Deseado Basin; (C) middle division, Deseado Basin to San Juan River; (D) crest profile of the crest and embankments which together form the San Francisco and Machado Basins; (E) center line of San Juan River, showing the character of bottom and extent of dredging required; (F) western division, Lake Nicaragua to Brito.

On all these detail profiles the material is accurately indicated in a manner which, once comprehended by a brief study of the symbols, becomes very distinctive. Thus, *red indicates clay* wherever it appears. Red clay is shown by plain red; blue clay, by red striped with blue; yellow clay, by red striped with yellow; white clay, by red striped with white. *Yellow indicates sand*, gravel being indicated by black dots on a yellow base, and clay and sand mixed by red and yellow stripes crossing diagonally. *Loams* are indicated by black vertical stripes. If it be a clayey loam, these stripes are on a red base; if a sandy loam, on a yellow base.

The distinction between rock and earthy materials of all kinds is so distinctive as to be at once grasped by the eye, even without the aid of any special description. Thus it is hardly necessary to refer to the key at all, although 12 different kinds of material are indicated.

In reference to the character of the earths, we may say, from personal examination of the samples of borings, and from the universal testimony, that all the clays seem to be exceedingly retentive of water. Even the mixed clay and sand seem to be an excellent natural puddle. The "loams" are all of them poor material to have about a canal bottom or dam foundation, and where they exist must be got out of the way. Fortunately, this material is not often encountered in objectionable positions, although some considerable deposits of it will be found under the embankment dams shown in Profile D.

The profile is reduced photographically from the very elaborate profiles which have been constructed by the company to the usual railway profile scales of 400 feet per inch horizontal and 30 feet per inch vertical. The reduced profile is to a scale of 3,000 feet per inch horizontal or only one seventy-fifth as large, and proportionately for the vertical scale, but as the reduction was wholly photographic the profile still remains minutely accurate, and may be enlarged to 7½ times its present size by a magnifying glass, or otherwise, and still afford as great accuracy as the original profiles. We think it but due to Mr. Menocal and his able staff of assistants to say that in a somewhat large experience with plans of this nature, we have never seen

any which showed such signs of careful preparation; nor do we recall any large enterprise in which there has been any approach to equal pains to determine precisely what had to be done before attempting to do it.

The basis of fact on which the sectional part of the profile is constructed the reader has before him in the profiles themselves, where the position and depth of the borings taken is accurately indicated to scale by vertical black lines. A considerable number of additional borings were taken too far off the line to be shown on it, but with this exception all the borings taken appear, except along the bed of the San Juan River (Profile E), where they were not accurately located, nor were they as carefully made as the others, being confined for the most part to a superficial examination of the bottom by rods, all material which could not be thus penetrated being called rock. It is not claimed, therefore, that this profile is as precise as the others, but it is believed to err chiefly by too much rock.

The other borings on all the profiles were taken with boring tools adapted for penetrating earthy materials only, the assumption being everywhere that the material below the lowest point to which the boring could be pushed was rock. This tends to safety in the estimates by exaggerating, if anything, the amount of rock; and it is altogether probable that, at a few points on the profile at least, the amount of rock is less than is shown. On the other hand, in the foundations of the locks it would be a disadvantage if the material should not prove to be rock; but the only doubt in this respect is deemed to be in regard to Lock No. 1, Locks No. 2, 3, 4, 5, and 6 being quite certainly on rock, and the material under Lock No. 1 being at least hard material in which boring tools will not penetrate.

Further borings by rock drills through the entire depth, rock and all, are now in progress at the great eastern divide cut, and will afford details for the subdivision of the "rock" into at least two classes, rock proper and *talpetate* or *tepetate*, two materials which differ very much in hardness and cost of excavation. The rock proper is a very hard, unstratified volcanic rock, and of this the great rock cut in the eastern division is mainly composed, with a coating between it and the clay of *talpetate*. The last is a material we have often described, found only in volcanic countries, and supposed to consist of consolidated volcanic ash or mud. It holds a slope quite as well as rock, and also requires powder for its economical working, being sometimes hard enough to serve as building material, but being much more cheaply excavated than ordinary rock, resembling in texture and hardness a very much under-baked brick more than any other material with which we are familiar. Immense deposits of it exist throughout Mexico and Central and South America. It will evidently tend to reduce the cost of the work quite sensibly should there prove to be a considerable percentage of this *talpetate* in the material shown as "rock" on the profile, but for the present this contingency is neglected.

The extraordinary natural advantages of this route, as shown by the large proportion of it on which there is a natural slack-water navigation, will be seen by a glance at the upper (general) profile on our colored sheet, on which all this class of navigation is colored blue, and all that part requiring canal excavation colored orange. In the aggregate there is:

	Miles.	
Canal in excavation:		
East side	16.048	
West side	11.160	
Six locks	0.759	
		27.967 miles.
Basin of the Deseado	4.220	
Basin of the San Francisco	11.368	
Basin of Tola	5.504	
		21.092 miles.
River San Juan	64.540	
Lake Nicaragua	56.500	
		121.040 miles.
Total length of route		170.099 miles.

Contrasting this with the two great previous canal enterprises we have:

Route.	Length.	Canal excavation.
	Miles.	*Miles.*
Suez	99.2	65
Panama	46.5	46.5
Nicaragua	170.1	27.9

Thus, although the Nicaragua route is the longest of the three, owing to a long, unbroken stretch of 121 miles of free navigation in the midst of it, the length of *canal proper* is by far the shortest of the three. By percentages we have the following comparison:

	Miles.	Per cent.
Nicaragua Canal:		
Canal in excavation	27.997	16.4
Free navigation, basins	21.092	12.4 } 83.6
Free navigation, lake and river	121.040	71.2 }
Total	170.099	100.0
Suez Canal:		
Canal in excavation	87.2	87.9
Free navigation, lake	12.0	12.1
Total	99.2	100.0

The Panama Canal is wholly in excavation, 4.3 miles of it being below sea level, and 42.2 miles above sea level, and mostly very much above it, as will be seen by referring to our profile of that canal published June 2, 1889. Up to that date the company's estimate showed 49,000,000 cubic meters (65,000,000 cubic yards) while there was about as much more work required even to make the lock canal. How many times more than this would have been needed to make a sea-level canal we can only guess. As this project is now hopelessly dead, however, we need not trouble ourselves further with data regarding it. The total estimate of rock and earth excavation for the Nicaragua Canal is only 55,513,638 cubic yards, as shown in more detail below.

A previous more detailed summary, differing somewhat decimally with that just given, but so slightly that it does not seem worth while to take the trouble to correct the trifling differences, shows the canal to consist of the following elements:

		West side.	East side.	Total.
		Miles.	*Miles.*	*Miles.*
A.	Sea-level canal dredged in earth from the coast	.57	10.00	10.57
B.	Rock through cuts with or without a coating of earth on top	6.40	2.836	9.236
C.	Canal in earth, through cuts, no rock	2.42	2.146	4.566
D.	Canal chiefly in earth, but with a layer of rock in the bottom	2.00	.354	2.354
	Total canal, apart from locks	11.39	15.336	26.726
E.	Natural surface flooded by proposed water levels so as to give 30 feet of water or over, without any dredging or excavation	4.53	13.60	18.13
F.	Do., requiring earth dredging only	.74	2.70	3.44
G.	Do., requiring rock excavation	0	0	0
H.	Locks	*.369	†.246 ‡.123	.738
I.	Natural water courses having 30 feet or over on proposed level	37.04	43.67	80.71
K.	Do., requiring earth dredging only	2.40	24.10	26.50
L.	Do., requiring any rock excavation	3.5	10.33	13.83

*All rock. †Rock. ‡Earth.

SUMMARY.

	Miles.
Natural water courses or artificial basins requiring no work at all on them to give 30 feet of water	98.84
Basin, river, and lake navigation requiring earth dredging below proposed water surface only to give 30 feet of water	29.94
Do., having a layer of rock in the bottom to be excavated or dredged	13.83
	Miles.
Canal sections, dredged in at sea level	10.57
Earth through cuts, no rock	4.566
Rock through cuts, some earth	9.236
Earth through cuts, some rock	2.354
Total length of canal in through cut	26.762
Six locks	0.738
	170.074

The company, somewhat to our regret, but we can not say unwisely, prefer not to put forward at this time any estimate of total cost whatever. The quantities, as computed by their engineers, they are quite willing to give, and they are given below. The transverse and longitudinal sections on which the quantities are based are shown herewith, and if they do not suit any one's ideas of what such sections should be, it is easy to recompute the quantities from the data given in this issue, either precisely or approximately. As to the cost of the work per yard, there has been so much discredit, just and unjust, thrown on such estimates in the past, that the company as yet prefer to maintain an entirely noncommittal attitude, and they decline to furnish us with any estimate on their part of what the work will cost per yard or in the aggregate, at least until the work has been actually let. They say simply: "Here are our quantities; here are the profiles and cross sections on which the quantities are based; the climatic and other conditions, so far as known, are thus and so. Make your own estimates for the present of what the total cost will be." This privilege we exercise elsewhere to some extent, but in the meantime will merely note that Chief Engineer Menocal's prices for the more important items in his estimate of 1885, which he states he has seen no reason to regard as too low, are as follows:

Earth excavation	per cubic yard	$0.40
Earth dredging	do	.20
Rock excavation	do	1.50
Rock under water	do	5.00
Stone pitching, rock furnished	do	2.00
Concrete	do	6.00
Stone in breakwater (from divide cuts)	do	1.50
Sheet piling in place	per M. B. M.	70.00
Trestle for dumping rock	per lin. ft.	22.00
Clearing and grubbing	per acre	100.00

This includes the main items of cost. The total quantities for the larger items are:

	Cubic yards.	
Earth dredging for canal (all below sea level)	23,489,478	
Earth excavation (all earth above sea level)	16,440,368	
Rock excavation	15,008,347	
Rock under water	575,445	
Total apart from harbor work		55,513,638
Greytown harbor, dredging	9,055,460	
Brito harbor, dredging	5,658,898	
		14,714,358
Total earth and rock excavation		70,227,996
Rock fills for dams and breakwaters (from divide cuts)		4,845,787
Earth fills for dams and breakwaters (borrowed from canal excavation)		5,085,171
Concrete (chiefly for locks)		518,675
Stone pitching		94,813

Among the miscellaneous items provided for in the estimates whose adequacy can be most satisfactorily judged by their aggregate cost are the following:

Gates for the six locks	$783,242
Two movable dams or guard gates	600,000
Machinery for locks	550,000
Buildings for locks	165,000
Pumping (chiefly for Locks 1 and 6)	200,000
Plant for lighting and buoying canal	372,200
Crib piers at entrances to canal (apart from breakwaters included in rock fills)	783,924
Three swing bridges across canal	60,000
128 miles telegraph	64,000
Total of miscellaneous items	3,578,366

By adding the total of the above list to the product of the above list of prices any one can determine for himself what may be called the "visible cost," and he will find it in the neighborhood of $55,000,000. To this there must beyond all question be added a very considerable percentage for hospitals, shops, cost of labor supply, de-

lays by possible epidemics. Even in this country we should add as a matter of course 10 per cent. to the above estimate for "engineering and contingencies." For this work there ought to be beyond all question a considerably larger percentage added, and there may be some question likewise as to whether there may not be slips and landslides, etc., which will require an enlargement of the proposed cross-sections. As to that, however, we may say that there seems little chance of it in the two big rock cuts where alone it could become an important consideration.

We ought to know absolutely as to this in a short time, when the borings through the rock are completed, as above noted, but in the meantime all the indications are that the rock will hold a steep slope well. This we understand to be the general opinion of all engineers and contractors who have examined the cut. Whatever other difficulties may arise, there seems no reasonable chance of there being another case of a mountain sliding in as fast as excavated, the formation being quite different from that at Panama.

The general character of the alignment of the whole route is correctly indicated in Figs. 2 and 3. About two-thirds of the route is tangent (omitting the lake, which is all tangent) and the remainder easy curves of 4,000 to 6,000 feet radius for the most part. The sharpest curve is in the divide cut, 2° 16′, or 2,528 feet radius. There are two or three other curves of about the same radius in the river, but for the most part the river channel is wide and straight. The precise alignment of the sailing line is not yet regarded as absolutely fixed; therefore, we do not give a complete table of alignment. A new alignment has recently been shown to be possible for the great divide cut, shown by the dotted line *A* in Fig. 3, which not only saves distance and curvature but saves about 1,000,000 cubic yards of rock excavation included in the above quantities.

After the completion of the chief engineer's report and estimate, an advisory board to report on the practicability and cost of the canal, as proposed by the chief engineer, was appointed as noted in our issue of Jan. 26, the board consisting of John Bogart, E. D. T. Myers, C. T. Harvey, H. A. Hitchcock, and A. M. Wellington. This board reported some time ago, but the company is not yet ready to give out the text of their report for publication for the reason above noted, that they do not desire as yet to commit themselves even by implication to any estimate of cost whatever, confining themselves simply to presentation of quantities, and other controlling conditions.

As for the two important and in a measure controlling conditions of climate and labor supply, we understand that the latter is not likely to be a very serious difficulty. Owing to the nature of the work, as above and below outlined, the number of employés required will not be at all in proportion to the magnitude of the work, since a very large part of it will be executed by machinery. All the earth excavation may be classed as dredging, since it will all be executed by dredging machinery, and this accounts for nearly 55,000,000 out of the 70,000,000 cubic yards of excavation. For this very few men will be required. The 500,000 yards of concrete will also be mixed by machinery and require labor in any amount for ramming only. The 15,600,000 cubic yards of rock is, most of it (14,000,000 cubic yards), in the two great divide cuts, and will be drilled and hauled by machinery, requiring labor in large amount for loading only. Here, however, will be the greatest demand for labor, and possibly 10,000 men may be required on these two cuts alone. The dams and embankments are now to be all rock fills, and not built of concrete, as heretofore proposed, the suggestions of this journal in favor of so constructing the dams, made in its issue of July 28, 1888, having been adopted by the company, thus greatly simplifying that important part of the work. All the skilled labor which will now be required for the dams will be only for a little sheet piling and trestle work.

It appears to be generally admitted that Jamaica negroes will furnish the bulk of the labor, and that 10,000 to 15,000 can be readily obtained from that island alone at $1 per day, more or less. With the miscellaneous thousands who are quite sure to flock to the work from all the other surrounding countries and islands, this ought to make the question of labor supply a comparatively simple one; provided no long-continued epidemics occur to drive away labor.

In respect to the question of health and climate, all accounts concur that the entire route is now and always has been free from dangerous epidemic diseases, and from frequent epidemics as well. Like New York and New Orleans, Greytown has had epidemics of cholera and yellow fever, but the last was some twenty years or more ago. In regard to the western coast, on which over a third of the work is situated, there does not seem to be the slightest ground for any anxiety as to health conditions. The climate is warm throughout the year, and hence somewhat debilitating for whites, but the rainfall is moderate, and there is rather less cause for anxiety than there would be for summer work in Texas, a great ameliorating influence being the brisk trade winds, which blow uniformly from the east over the entire length of the canal, and make the nights cool and comfortable. The importance of this advantage over Panama, where this trade wind is wholly absent, can hardly be exaggerated.

On the eastern division there is a great deal of rain; about as much as at Panama, or a decided wetness throughout most of the year. There is also not a little *calentura* (the Spanish name for intermittent fever) which in tropical regions is at times a

serious and fatal disease. But with proper care and caution, and avoidance of all use of stimulants except a small dose at night after work, there does not seem to be any difficulty in keeping in good health continuously in eastern Nicaragua. According to a great variety of independent information which has come to us from time to time, the great and only essential for health along the coast is strict attention to hygiene. Yellow fever has never existed continuously in Greytown, as it does in Havana and Vera Cruz. It may possibly become endemic during construction unless careful sanitary precautions are taken, because the town will be likely to have a mushroom growth to a considerable size; but the company, with eminent foresight and wisdom, are now laying pipes to supply abundant pure water, and purpose sewering the town also, we are informed, as soon as its growth begins.

A most important consideration in respect to this question, moreover, is this: The general character of the coast is a broad, low coast flat, through which the dredging occurs, ending in an abrupt escarpment, in the lowest point of which the "great divide cut" occurs, the main crest in the vicinity being upwards of 500 feet high, and directly exposed to the trade winds. It is at this cut that the bulk of the laboring force is required. As the work will last four or five years at least, the camp may be permanent, and the conditions of insuring health in a great permanent camp exposed to the direct blast of the trade wind and with an abundant supply of pure, cold water, would seem to be unusually favorable. That they are so, and that health might be maintained in such a camp by strict policing, even if epidemics were raging in Greytown, seems to be the general opinion of those who ought to know. There is no use disguising the fact, however, that there will be danger of sickness at Greytown when the inevitable host of camp followers occupies it, unless, as ought to be done, the whole town can be put and kept under martial law.

It is proposed to construct 35 miles of railway on the eastern division, from Greytown to the Ochoa dam, and 18 miles on the western division, from the Pacific to the Lake. It is now under consideration, however, whether the 10 miles of railway between Greytown and Lock No. 1 can not be saved, starting the railway from the latter point, and using east of it the natural chain of water communication shown on Fig. 3, improved a little at points, until a channel can be excavated through to the same point by the first cut of the dredges. In that case, the breakwaters at Greytown would be built by deposit of stone from scows instead of from railway cars. We can not see why the suggestion is not a good one.

The dimensions proposed for the locks are 650 feet long by 70 feet wide (increased this year from 65 feet) by 28 feet deep. The chamber width of the locks will be 80 feet. The Sault Ste. Marie lock, the largest yet built in the world, is 515 feet by 80 feet by 17 feet on miter sills, or 16 feet draught. The new lock now building will be 800 feet by 100 feet by 21 feet, on miter sills, but this great size is only for the purpose of letting through several vessels at once. The main dimensions of the largest ocean steamers are as follows:

	Etruria and Umbria.	City of New York and City of Paris.	Teutonic and Majestic.
Length	501.6	565	582
Breadth	57.2	63.2	57.5
Depth hold	38.2	42	39.2
Draught (about)	27	27+	27+

The above draughts is about all these vessels can draw to enter New York; the "Plimpsol mark" is somewhat higher.

The above seems all the data which it is necessary to give, in addition to that given in our issue of July 14, 1888, and in the following article. This is certainly the most important engineering project now before the world, and we can not doubt will be triumphantly carried through to completion. Had the project in its present shape been before the Lesseps congress of 1879, it can not reasonably be doubted that even that most prejudiced body would have adopted it *nem. con.*, as it is from every point of view so vastly superior to that at Panama, and the Nicaragua Canal would now be open to the world; but, unfortunately, there was only the old survey of 1872-'73, with its 20 locks, 4 dams of the San Juan, 6½ miles of extra distance, and 49 instead of 27 miles of canal excavation to lay before that body.

Preliminary work has been now for some weeks in progress on the canal, mainly in the way of getting the camps established; water pipes to supply Greytown laid; railway located and right of way cleared; deep drillings made through the rock cut; harbor works at Greytown started, etc. No contracts have as yet been let, but negotiations are in progress with several parties. When the contracts are let they will probably be very large ones, to three or four parties only. We understand that the question of raising the money is now regarded as merely one of detail, not of difficulty.

APPENDIX F.

THE NICARAGUA CANAL.

[From the *California Banker's Magazine*, October, 1890.]

The active and successful prosecution of work on the interoceanic waterway through Nicaragua is a matter of such vital importance to the Pacific coast that it should receive the cordial support of all our people. Like all great works of this character, however, the far-reaching results are little considered by those whose interests will be the most affected.

When the subject was first introduced to the people of this coast in 1880 the growing interest of agriculturists was met by the assertion that the railways would furnish all the necessary transportation for wheat to Atlantic ports, whence it could be cheaply carried to Europe by sea. The promise was not fulfilled, and the Cape Horn route still controls the Pacific coast wheat trade, which is as much a gamble as any hazardous game of chance can be. Ships are now generally chartered and loaded by one party; the cargo is purchased, loaded, insured, and sails on its voyage of four to four and a half months of *free storage*, during which time it must be disposed of, frequently at a loss, unless, as a last resort, consigned to an European firm, in which case commissions and the usual multiplicity of charges generally make a heavy loss to the shipper. The market here, under normal conditions, follows the English market so closely that it is seldom that a cargo just loaded shows any profit with charges added; often on the day of sailing it shows a loss, and becomes a gamble, with chances against the shipper. It is a noticeable fact that fortunes have been lost here in the export wheat trade, while none have been made. It is not in the prescience of humanity to foresee the future; to correctly forecast the rainfall and weather months in advance, and to correctly gauge crops at the four quarters of the globe not yet planted; it becomes a gamble against the forces of nature. Such has been the Pacific coast export wheat trade; such it will cease to be the day the canal is open!

The time for transportation will be reduced to *twenty-five days' easy steaming*, and the distance *decreased by* 10,000 *miles*. Wheat will be shipped as other merchandise, in any quantity, from 5 tons to 5,000, already sold by wire, or consigned with a margin already ascertained, with a delivery practically assured within a day or two. It will become a mercantile transaction on comparatively assured profit, however small, the gambling element almost entirely eliminated. The producer of small or large quantity can ship his own product, if he wishes, as ocean steamers will be always ready to receive it, or any other freight, in any quantity. *Ocean transportation is the cheapest known to commerce*, comparing with average railway transportation as *one to five* in cost, and the ocean is free to all; admitting of no pools or combinations. It is God's great highway—nature's anti-monopoly route, a road that never wears out!

"Not so thou;
Unchangeable save to thy wild waves play
Time writes no wrinkle on thine azure brow:
Such, as creation's dawn beheld, thou rollest now!"

One large ship can carry a cargo equal to twenty railway trains of ten cars each. The completion of the canal will open the markets of northern Europe to California fruits and garden products, by the use of steamship refrigerators. A temperature of 38° to 40° Fahr. will prevent decay in fruit indefinitely, if the cold atmosphere be devoid of moisture. Fresh meats have been, for a few years, successfully transported in this manner from Australia and New Zealand to Europe. The transportations of meats in refrigerators on sea voyages requires a temperature about 26° Fahr., which is a much more severe test than will be required in transporting fruit. The past season has opened the Eastern market to our horticulturists, and they can fully ap-

preciate the still greater advantages of *a market in northern Europe* for their grapes, pears, peaches, plums, oranges; all the varied products of the orchard and the farm; arriving there during a portion of the year at a time when local products of this character are not to be purchased at any price. With such a demand added to our domestic market, overproduction will be impossible.

The *export lumber trade* of the northwest coast will be vastly increased by the waterway through Nicaragua. Already occasional cargoes are sent via Cape Horn to Europe, and via cars to the eastern seaboard. But when lumber can be freighted at materially decreased cost, and in one-fifth the time, the trade will rapidly grow in importance. Europe and our Eastern seaboard is mostly denuded of timber, and the demand will steadily augment at improving prices. The States of Washington and Oregon, as well as the Territory of Alaska, will in this trade promptly realize the benefit of the new commercial route.

The *trade of India, China, and Japan can not* fail to be greatly affected. The Suez route will no longer be able to supply our Atlantic ports with tea, silks, etc., the route across the Pacific and via Nicaragua being three days' shorter steaming distance, under much more favorable conditions as regards navigation, with Honolula as a port of call and coaling station. The mistaken policy of making our Pacific coast ports *way stations* and New York the main distributing point must then be discarded, and distribution *from the Pacific coast eastward* will be the aim of railway companies with terminals at Pacific ports. The diversion of this trade need not be feared at San Francisco, and the conditions connected therewith, now imposed upon us by the present railway policy, can not well be made worse, as under them we have been gradually losing the trade of China and Japan, which properly belongs to us by geographical position.

The territory in northwestern America tributary to the canal will extend to the Arctic Ocean and eastward to the 100° meridian. For five months in the year water communication eastward from the interior of the great northwest is cut off by frozen lakes, rivers, and canals. During this period, instead of yearly awaiting the opening of navigation, transportation to the Pacific coast will solve the question of time and interest, with the assistance of the open waterway through Nicaragua to Atlantic ports. This alone will more than compensate our Western railway systems for any diversion of trade caused by the canal, and, with the adoption of the policy of distribution eastward from Pacific coast posts, will materially improve their earning capacity, independent of the rapid development of the Pacific coast after the opening of the new waterway.

The fisheries of the Pacific coast, now in their infancy, will add to the revenues of the canal, and greatly increase our shipping interests. Already the attention of parties engaged in this industry on the Atlantic coast has been attracted to this new field, and when they can place their vessels on the fishing ground in a comparatively short voyage, and return cargoes unbroken in bulk, there will be inducement for a large and remunerative business. We have considered thus far only the *commercial* advantages of the Nicaragua Canal; much more might be written on this branch of the subject, but the limits of this paper forbidding, we must pass on to the consideration of *political conditions.*

The construction of the Nicaragua Canal under present auspices will secure the *domination of the United States over the American Continent*, politically as well as commercially. The position of Lake Nicaragua is unique; Gibraltar is not a circumstance to it in importance. A naval station on this inland sea, with fortified termini and an efficient fleet, will control the *Atlantic eastward to the Windward Islands of the West Indies* and westward to the *Hawaiian Islands and Samoa.* On its fresh waters iron-clads can lay without diminished speed caused by foul bottoms, with fresh water for boilers, in a delightful climate, splendid harbors, surrounded by a territory producing maintenance for the personnel of fleets and armies. *The nation that, with the Nicaraguan Government on a joint agreement, controls Lake Nicaragua will then control the destiny of the Western Hemisphere;* it will be, in fact, *a constant assertion of the Monroe doctrine*, securing respect for its requirements by the peaceable possession of power to assert them. The foreign policy of our country will become of greater importance every year. A nation of 65,000,000 can not ignore, at this age, its national responsibilities and maintain its self-respect. The protection of its citizens and their property abroad is as much a duty as government at home. In vain may we send out commissions to seek outlets for our products and manufactures if we do not propose to follow them with our national protection. The public demand for a modern navy indicates the will of our countrymen on this momentous question.

One great advantage possessed by the Nicaraguan Canal over any other project of the kind is the *fertility and resources of the territory through which it passes.* The Suez Canal has a sandy desert on each side; the Panama Isthmus is a region of floods without local resources, but Nicaragua is one of the *garden spots of the world.* With a climate tempered by the northeast trades, which, in this favored region, blow

perennially across the Republic, with a fertile soil, assured rainfall, and internal water communication, we shall there see a development of resources shortly after the canal is opened which will alone pay the cost of its maintenance, and aid in its increasing dividends. Coffee, sugar, cochineal, indigo, the finest cocoa in the world, India rubber, cotton, and all the tropical fruits are among its productions, while a large part of the Republic is covered with valuable forests of mahogany, cedar, grenadilla, black walnut, ebony, and various dyewoods. In the eastern department, bordering the lakes, are found rich mines of gold and silver, some of which have been worked for years, mostly by European capital. When Lake Managua has been connected with Lake Nicaragua by the short canal provided for, and all this fertile region is connected by water communication, supplemented by railroads, it needs no prophet to predict the development which will ensue on this highway of the world's commerce. It would demand a canal on its local conditions, aside from its character as an interoceanic highway.

What can be expected from the canal financially? This fundamental question is worthy of critical investigation.

The character of the work, with its twenty-eight miles of canal in excavation on the surface, with its easily-solved engineering problems, the most difficult of which (the restoration of the harbor at San Juan del Norte) is already partially solved, permit us to predict that its limit of cost can be assured with reasonable certainty. The several surveys have been exhaustive and satisfactory, and the borings have furnished the necessary information as to material to be excavated. With this abundant data, the engineer's estimate is $64,043,697, exclusive of interest during construction and banker's commissions. The careful report of the canal committee of the board of trade of San Francisco (of which the writer had the honor to be chairman) in 1880, places the estimate of possible cost at $100,000,000, and we now see no reason for increasing this except for the substitution of larger locks, which it is now proposed to increase to the following dimensions: 1,000 feet long, 100 feet wide, and 30 feet deep, which will enable two to four vessels to pass through at one lockage. The estimated tonnage by the report of 1880, alluded to, was 5,000,000 tons per annum. Subsequent developments assure us of 6,000,000 tons before the canal can be completed in 1897. At $2.50 per ton toll (about the same as now charged at Suez), this will make an annual revenue of $15,000,000, from which, deducting the liberal estimate of $1,000,000 per annum for operating expenses and repairs, leaves a net revenue of 14 per cent. per annum. Even if the cost be increased to $150,000,000, we have a net revenue per annum of 9⅓ per cent. The Suez Canal, costing $94,000,000, has returned larger dividends than these, and is still increasing. These estimates do not include the *local traffic*, which would rapidly develop into larger proportions, or the *passenger traffic*, which would be large, for a trip through the Nicaragua Canal will become a favorite recreation, owing to the beauty of the scenery and the climate of the lake region. There is not a doubt that the property would start out on a paying basis, and rapidly develop into one of the best-paying investments in the world; ultimately better than the Suez Canal, which served to divert a commerce *already* developed, while the American Canal has all the possibilities of an equal traffic, with illimitable development in the future.

The lockage question is one of interest to students of this subject, and I may be permitted in this connection to quote from the recent report of Charles T. Harvey, C. E., regarding the operation of the lock canal at Sault San Marie, between Lake Superior and Ontario. This work shows the following comparison with the Suez Canal (water level) in the year 1889:

	Number.	Tons freight.
Lake Superior canal lockages	4,684	7,516,022
Suez Canal passages	3,425	6,800,854
Total	1,259	709,168

The American lake canal with lock has thus exceeded the Suez Canal, in 1889, 33 *per cent in voyages and* 10 *per cent in freight*, and, therefore, ranks first as to commerce among the world's artificial water ways. And this was done in *seven months'* day and night work, against the twelve months at Suez, the American work having been blocked by ice during five months of the year, approximately.

Why this enormous development of tonnage, except that it is unapproachably cheaper than land carriage can ever be? Eleven minutes fills the lock and eight minutes discharges it; 87 vessels have been passed through daily. On this showing the capacity of the Nicaragua Canal with one set of locks may be placed at 14,000,000

tons per annum, which can be doubled by duplicating locks, as the water used for lockage with one set of locks is only 10 per cent of that now being discharged by the Rio San Juan at ordinary lake level, without regard to rainfall and without lowering the lake level. The expense of operating locks is well attested by the Lake Superior Canal, where nearly 8,000,000 tons were lock-lifted in 1889 at an expense of $36,000, making a rate of *four-tenths of a mill per ton.* The liability to accident is illustrated by the experience of a third of a century at the same water way. The lock gates are operated by hydraulic power and guard gates are placed at a proper distance, to be used when necessary. Occasionally minor accidents have occurred at the entrance of the lock, but nothing that materially interfered with traffic. Alluding to the work of the Lake Superior Canal Mr. Harvey writes: "I have seen fifteen steamers, some of 3,000 tons, as *passed, passing, or waiting to pass the locks*, and within one hour all had disappeared on their respective voyages." I may conclude these observations on locks by quoting from the report of the board of trade of San Francisco, published in 1880, before alluded to: "We see no reason why the philosophy that nature teaches should not be made use of to conquer the obstacles that nature places before us; and we claim that it is better and more reasonable to carry a ship over a summit by means of lift locks than to build a sea level canal at an incalculably increased cost."

The Nicaragua Canal, supplemented by increased facilities for distribution by rail, is the great need of San Francisco and other Pacific coast ports. It will certainly change the highways of commercial transportation; but, where a temporary injury is inflicted, a three-fold compensation comes with the adjustment of the new conditions. Our coast, our country, and the world are ready for this great and beneficent enterprise. It will be a prosperous day for San Francisco when its wharves are crowded with ocean steamers which have passed "the Gate of the Pacific," and through the Golden Gate to our commercial metropolis. The ocean—*God's great highway*—will be open to us, with a reduction in distance of 10,000 miles to European and Atlantic seaports—two-thirds of the navigable distance discarded forever—nearly one-half of the earth's circumference. The American flag restored to the ocean; American seamen ready to defend their country abroad; increased markets for our producers; increased business for our merchants; increased values for our land owners; all these, with increased prestige and political influence to the great Republic will follow the opening of this ocean highway. Before the dawn of the twentieth century this will have been accomplished, marking another epoch in the commercial history of the world; a monument to American energy and a benison to mankind.

WILLIAM L. MERRY.

APPENDIX G.

NICARAGUA CANAL CONSTRUCTION COMPANY.

REPORT ON FINAL LOCATION OF THE CANAL.

[By A. G. MENOCAL, *Chief Engineer*]

NEW YORK, *January* 31, 1889.

To the President and Board of Directors of the Nicaragua Canal Construction Company:

GENTLEMEN: I have the honor to submit the following report of the results of the final surveys for the location of the canal through the territory of the Republic of Nicaragua and in that of Costa Rica, by the Nicaragua Canal Construction Company under contract with, and on account of, the Nicaragua Canal Association.

These surveys were commenced in the early part of the month of December, 1887, and were conducted with marked ability and uniform devotion to duty by eight well equipped parties, supplemented by a well-organized and efficient medical department and the necessary force of draughtsmen, artists, clerks, stenographers, and other subordinate assistants.

The eight parties comprising the regular field working force were divided as follows:

Six land surveying parties, each composed of one engineer in charge, four assistants, and from fifteen to twenty laborers.

One hydrographic party with one engineer in charge, three assistants and ten men.

One boring party in charge of an engineer, with ten laborers.

In addition to this permanent force, two or three smaller parties, each composed of one or two engineers and a sufficient number of assistants and laborers, were constantly employed in carrying out local surveys and reconnaissances, either in advance of the locating force or supplementing the location by local detailed surveys at places where additional information was regarded as necessary for a more perfect knowledge of the complicated topography.

This large and efficient force was kept constantly employed from the 15th of December until the latter part of June, when the advanced state of the work made necessary a reduction in the number of employés. In fact, at this time the canal had been located from the Atlantic to the Pacific, and but little information, and this not essential to the solution of the problem, but desirable only in order to arrive at the degree of accuracy prescribed by the company, remained to be obtained. Some of the engineers were then ordered to the company's office in New York, to be engaged in plotting and developing, in a comprehensive and concise form, the results of the field operations. The field working force was reduced to three surveying parties and the boring party, which force has been actively at work and is still engaged in making local surveys, cross-sectioning in the vicinity of the canal work, locating the flowage line in the San Francisco Basin and in the valley of the river San Carlos, and surveying for a canal between Lakes Managua and Nicaragua.

The work accomplished to the present time may be summed up as follows:

First. Location of the canal from the Pacific to Lake Nicaragua, with numerous cross-sections and the survey of the flowage line in the proposed basin in the valleys of the rivers Grande and Tola. Through these valleys two locations have been made, one for a canal in excavation throughout and the other for a canal partly through a deep basin. Both have been located with the same care and attention to detail. The estimate submitted with this report is based on the latter plan.

The proposed flooded area contains over 4,000 acres of grazing land, and the relative cost of the two methods of canalization can only be ascertained after this land has been legally condemned. Borings have been made at numerous points along the route, including the basin, the curves having been actually located on the ground

and detailed surveys for artificial drains, embankments, and weirs, and of the sites of the locks, etc., having been elaborated for both plans, there need be no delay in the progress of the work when a final decision is reached.

Second. The hydrographic party has completed the survey of the harbor of Brito, of the west coast of Lake Nicaragua, in the vicinity of the mouth of the river Lajas, of the east coast of the lake at Fort San Carlos, several local surveys in the river San Juan, and the survey of Greytown and adjacent coast and lagoons. These surveys have been carried out with remarkable skill and accuracy and very much in detail. In the lake the soundings have been carried out beyond the 40-foot contour, and offshore at Brito and Greytown to the 9-fathom line. In the inner harbors and in the rivers in the vicinity thereof the exact contour of the bottom can be determined by the numerous soundings taken. Observations for determining the currents, both inside and outside the harbors, for the direction of the winds, and for the rise and fall of the tide, have also been taken. All this comprises a mass of most valuable data, which has been used to great advantage in designing the necessary work for the improvement of the harbors and in estimating the amount and cost of the dredging required therein.

Third. Local surveys have been made in the river San Juan at all places where the data on hand were deemed insufficient for a close estimate of the amount and cost of excavation needed, or to determine with reasonable precision the difficulties likely to be encountered in the construction of dams, embankments, or other works entering as important factors in the general scheme.

Fourth. The river San Carlos has been surveyed from its confluence with the San Juan to a point about 3 miles above its tributary "Tres Amigos," where the contour 106 feet above sea level was reached. From that point this 106 feet contour has been instrumentally located, east of the main river, and up both banks of all its tributaries coming from that side, following all the sinuosities in the expansions and contractions of the valley until Ochoa was reached, at the south abutment of the proposed dam across the river San Juan, thus establishing, beyond a doubt, the practicability, at a comparatively small cost, of impounding the waters of the San Carlos at the elevation of 106 feet above sea level, as raised by the proposed dam at Ochoa.

Fifth. The survey of that region from the valley of the Machado above the site of the dam at Ochoa to Greytown has been the subject of much labor and serious consideration, and has consumed much time, and not less than four-fifths of the labor of the expedition. The primeval condition of the country, covered as it is with dense vegetation and high forest growth, through which no extended view can be obtained from any point, of itself renders an accurate knowledge of its topographical features both laborious and difficult to obtain; but if I add to this the absolute want of means of communication except by canoe through capricious water courses, of which but little information has been acquired by previous explorations, and an unusually complicated topography, in which extensive swamps and more or less connected ranges of hills are constantly met with in such an irregular and unexpected manner as to baffle completely all calculation as to its actual condition without an instrumental examination of every inch of the ground, some idea may be gathered of the difficulties with which we have been confronted.

Two routes through the last mentioned region had been proposed by previous surveys; and it was the object of the association to make a thorough examination of the entire area so as to eliminate all doubtful questions, and, with a perfect knowledge of all the conditions involved, to select that route presenting the greatest facilities for the construction of the canal, both in regard to the economy and permanency of the work.

One of the routes extends on a nearly direct line from Ochoa to Greytown, and has been designated the "Upper route" by reason of its being located in the upper part of the valley and its most striking feature of retaining and extending the summit level to within a short distance of Greytown itself.

The other is known as the "Lower route," since it descends to the valley level of the San Juan a short distance below Ochoa, stretches along and at several points runs in close proximity to the bank of the river, until it reaches Punta Petaca, above the San Juanillo, where it turns to the north, and by a straight line reaches Greytown at about the same point as the "Upper route." This route was located by the United States surveying expedition of 1872–'73, and the former was the result of my surveys of 1885, conducted by order of the same Government. The work of relocation was undertaken for both routes from end to end with the whole force of the expedition, previous explorations and surveys being ignored except for the information to be derived therefrom and for purposes of comparison, the object being to improve, if possible, on what had already been done. It required the constant labors of six surveying parties, and the boring party six months, before the location of the two routes had been elaborated and advanced to the point where a fair comparison of their relative merits could be made: and, since the selection of the "Upper route," two parties have been engaged for five months in perfecting the location and gath-

ering such a mass of valuable information as to leave no doubt whatever regarding its superiority, and the amount and character of all the work involved in the construction of the canal. No problem has been left unsolved, and what is now presented as the result of these arduous labors is an actual representation of the *natural conditions.*

THE PROPOSED ROUTE.

The proposed route from the Atlantic to the Pacific is in general direction and, with but slight modifications, identically the same as that proposed by me in 1885. The changes introduced consist principally in the addition of two new basins, and the extension of free navigation in the San Francisco Basin, by which the length of canal in excavation has been considerably reduced, with proportionally increased facilities to navigation, and the problem of draining the country traversed by the canal satisfactorily solved.

San Juan del Norté (Greytown) on the Atlantic, and Brito on the Pacific, are the termini of the canal, the total distance from port to port being 169.448 miles, of which 26.783 miles will be excavated canal, and 142.659 miles free navigation by Lake Nicaragua, the river San Juan, and through basins in the valleys of the streams Deseado, San Francisco, and Tola. Lake Nicaragua is necessarily the summit level of the canal, and its elevation above mean sea level is taken at its mean as 110 feet. It will be connected with the Pacific by two sections of canal in excavation and the Tola Basin, and with the Atlantic by slack-water navigation through the valley of the river San Juan, and a series of basins in the valleys of the San Francisco and Deseado, connected by short sections of canal, the sea level on each side being reached by three locks which have been located as near as possible to the extremities of the canal, viz, 3½ miles from Brito and 12¾ miles from Greytown, thereby giving a clean summit level of 153¼ miles in extent out of a total distance of 169½ miles, as stated above. For the purposes of this report the whole route has been divided into four divisions, viz, eastern, San Francisco, Lake and River, and western.

Eastern division.

[From the inner harbor of San Juan del Norté (Greytown) to the San Francisco Basin, 18.864 miles.]

The line selected and located starts from the inner harbor of San Juan del Norté, and extends in a southwesterly direction for a distance of 9.297 miles to Lock No. 1, in the valley of the small stream Deseado, which descends from the high ridge separating the valley of the San Juanillo from that of the Caño San Francisco. Where the stream Deseado interferes with the course of the canal it is to be diverted by artificial channels. The first 9.297 miles of canal will be at the level of the sea, forming, practically, a prolongation of the harbor of Greytown, the width proposed allowing ample room for the passage of vessels going in both directions. The excavation will be entirely through flat alluvial deposits, as shown by the numerous borings taken along the whole line.

The first lock from this reach will have a lift of 30 feet, and the uniform dimensions of chamber adopted for all the locks, viz, 650 feet long and 70 feet wide. A suitable bit of high ground for the site of the lock is met with in the lower valley of the Deseado. From the head gate of Lock No. 1 to Lock No. 2 the canal follows the valley of the Deseado, which is here partially flooded by the construction of four low embankments connecting the site of Lock No. 1 with the sides of the valley. In this manner the canal excavation, which here consists chiefly of a stiff, red clay, underlying a thin strata of loam, is much reduced, and the drainage economically and efficiently controlled by suitable weirs of maximum flood capacity.

Lock No. 2, located 1.258 miles above the head gate of Lock No. 1, has a lift of 31 feet and will rest on solid ground, a hill on the south side of the valley affording an excellent site for it.

Lock No. 3, with a lift of 45 feet, is located 12¾ miles from Greytown and 1.927 miles from the head gate of Lock No. 2. This section of the canal occupies the lower basin, made in the valley of the Deseado by the erection of a dam 38 feet high and 1,300 feet long across the stream, and two embankments of an aggregate length of 1,400 feet and about 20 feet high on the top of the confining ridges. The only excavation needed through this basin is in cutting across three low hills of red clay.

At this point the valley of the Deseado is spanned by an embankment 70 feet high and 1,050 feet long, resting on two high hills, and the gaps on the ridge connecting this embankment with the sides of the valley are closed with smaller embankments, aggregating 5,800 feet on the crest, with an average height of 20 feet to the level 112 feet above sea level. By this means a basin 3.086 miles long is created in the valley of the stream, in which a depth of from 30 feet to 70 feet is obtained, without exca-

vation, for a distance of 2.598 miles. It is proposed to retain the water in this basin at an elevation of 106 feet above sea level; in other words, the summit level of the canal is carried across the "divide" and extended to Lock No. 3, or to within 12¾ miles of the Atlantic, and but 3½ miles from the sea level, which, as stated above, reaches 9¼ miles up from Greytown. The advantage of these two large reservoirs in close proximity to the locks need not be commented upon, and the facilities afforded as a "turn out" for ships in waiting and traveling in opposite directions can not be overestimated. The dam is proposed to be built of stone, or what is termed "rock fill" with earth backing, and will have a weir 600 feet long on the crest, and a fall of 45 feet, for the discharge of the surplus water into the lower basin. This will be supplemented by another weir 800 feet long located on the south side of the valley in a gap between the hills inclosing the upper basin, giving a total length of weir of 1,400 feet.

At the western end of this basin begins the "eastern divide cut" connecting the valley of the Deseado with that of the Caño San Francisco. This cut is 2.917 miles long, has a maximum cut of 298 and an average depth of 111.2 feet above the level of the water, the depth in the canal being 30 feet, and contains about 21 per cent. of the total excavation estimated for the whole canal.

The magnitude of this work grows less striking as we proceed to examine its importance as a factor in the solution of the problem, the local advantages for its execution, its permanency when finished, and the advantageous and economical disposition of the material to be excavated.

First. It will be observed that this cut is almost in a direct line between Ochoa and Greytown, which are the two objective points of the canal; the former being the point at which it must of necessity leave the San Juan River, and the latter equally necessary at its terminus on the Atlantic.

Second. It is the lowest point along the whole ridge which intervenes between those two points, and nearly equidistant from each.

Third. It is also the narrowest pass, by several miles, of any other on the ridge, the valleys of the Deseado on one side and the San Francisco on the other here penetrating it further than elsewhere, thus allowing the greatest possible extension of their basins with the least excavation.

Besides the above there are several other important advantages connected with this particular pass entitled to much consideration.

First. The material to be removed is in the main solid rock, therefore the volume of excavation is reduced to a minimum, and the cut when made will remain so forever without further expense.

Second. The material is needed for the construction of the dam at Ochoa, for the embankments between Ochoa and Greytown, for the construction of the locks, for the breakwater at Greytown, and for pitching the sides of the canal, and whatever is left over can be dumped in the immediate vicinity.

Third. The center of distribution is most conveniently located, and were not this material available, at the sole expense of transportation down grade, it would have to be obtained at considerable cost from quarries in the vicinity, as there is no rock easy of access between Ochoa and Greytown, except in this ridge.

Fourth. The locality is one of the healthiest in Nicaragua, the drainage is perfect, and water abundant and excellent for domestic uses.

Fifth. There is close at hand on both sides of the ridge an inexhaustible water power for the economical and convenient operation of all the machinery required to do the work.

Posessing, therefore, as it does, this truly marvelous coincidence of favorable circumstances, it would seem as though the very hand of Nature had made this particular spot with the view of facilitating the execution of the greatest undertaking of this or any other age. With proper appliances and good management, so much of the work in the adjacent sections being dependent upon the material to be got from this cut, an even rate of progress can easily be maintained and the whole work be pushed to completion well within the six years estimated as the time for completing the canal.

San Francisco division 12.500 *miles.*

[From the western end of the Divide Cut to the river San Juan at Ochoa.]

On the western slope of the Divide the canal follows the valley of the Limpio for 1,477 miles to the end of the Cut. Before falling into the San Francisco basin it passes for .738 miles through a rolling country into the lower valley of the Limpio, the average depth of the cutting for this distance being 16 feet above the bottom of the canal.

Passing into the basin of the Caño San Francisco it follows the valleys of the Limpio and Chanchos to near the confluence of the latter with the San Francisco, and then

up the valley of the stream, skirting the hills on the west to a favorable pass in the range separating this valley from the swampy region, called Florida Lake, extending towards Ochoa. The line of location follows this swamp to its western extremity, where it strikes the high rolling country intervening between this low region and he valley of the Machado; and following a tributary of the latter, it strikes the river San Juan 1,600 feet above the mouth of the Machado. The distance from the western end of the Divide Cut to the bank of the river San Juan is 12.500 miles, of which 7.481 miles are tangents and 5.019 miles comprised in eleven curves of from 4,000 to 11,459 feet radius. The hills surrounding the basin on the south do not form an unbroken range rising at all points above the level of the water, which in this section also is maintained at 106 feet above sea level. Eight gaps will have to be closed by embankments aggregating in length to 2,440 feet measured on the valley floor, and 12,260 feet on the crest, the maximum depth being 60 feet below the level of the water in the basins.

In addition to the above, 59 smaller embankments, aggregating in length 18,280 feet on their crest, rising 6 feet above water level and varying in height from 1 to 50 feet, will be required from Ochoa to the main ridge of the Divide. All the embankments resting on the valley or swamp level are designed of rock fill and earth backing, with three parallel rows of sheet piling between abutments.

The total length of basin secured by this plan is 11.267 miles from flowage line to flowage line, of which 8.697 miles is in water varying from 30 to 60 feet in depth. That is, of the 12.500 miles in the division, but 1.233 miles will be wholly and 2.570 miles partly in excavation. This is not, however, the only advantage gained by the creation of this basin. Without it the cut across the "Divide" would be of such proportions as to make the route commercially impracticable, and the basin of the Deseado an impossibility. Not less important are the additional considerations of free navigation through a wide and deep basin, instead of a restricted excavated channel. In the former vessels can travel at full speed, lie at anchor or pass each other at all points, while in the latter the position and speed of all ships must conform to rigid regulations.

Attention is also invited to another striking feature of this work, as compared with that close to the bank of the San Juan.

In a country subject to observed rainfalls of more than six inches in 24 hours, the problem of drainage involves dealing with forces of Nature whose enormous destructive powers are a constant menace to engineering works, however careful and skillful their design and execution. And it is of the utmost importance, therefore, to reduce these forces to a minimum before the construction of works to withstand them. The large territory embraced between the ridge confining the basin to the south and the "Lower Route" is, by the adoption of the "Upper Route," entirely eliminated from the problem of drainage, leaving only that portion of the watershed north of the ridge from the Divide to the valley of the Machado to be provided for. The area of this catchment basin is about 65 square miles.

It is proposed to build all embankments across the valleys in the disconnected portions of the ridge of "rock fills" and earth backing, the crest to be 107 feet above sea level, and with the top and outer slope so shaped and paved with large stones as to admit the free flow of water over the surface without danger of injury, all other embankments to be 112 feet above sea level. All these embankments will be, in fact, so many waste weirs for the discharge of the surplus water at several points in the basin, with an aggregate length of 4,720 feet of spillway and assuming that the embankments are perfectly tight, which will not be the case until several years after construction, and therefore that all the surplus water passes over the weirs the maximum thickness on the crest will not exceed 15 inches.

An extraordinary freshet in the San Juan above the dam would probably cause some of the river water to flow towards the basin, but it will be observed that the weirs in the basin alone are capable of discharging 90,200 cubic feet per second before the water reaches the top of the higher embankments, and that, in such extreme cases, the basin would also be discharging through the divide cut, over the Deseado Dam and weirs, and, if need be, through the culverts of Lock No. 3. As an additional precaution, a guard gate is provided in the first cut east of the Machado, by which the waters of the river San Juan may be shut off from the basin. With these ample provisions the destruction of the smaller earth embankments by an overflow of the basin seems to be well guarded against.

Lake and river division, 121.04 *miles.*

[From Ochoa to the western coast of Lake Nicaragua.]

This division extends from the western extremity of the San Francisco division in the valley of the Machado to the entrance of the canal on the west shore of Lake Nicaragua. The total distance is 121.04 miles, divided as follows: Navigation by the

river San Juan, 64.54 miles; Lake navigation, 56.5 miles. The section of the river from Ochoa to the lake is to be made navigable by the construction of a dam at Ochoa, just below the Machado, maintaining the water at the summit level of 106 feet above sea level. It may here be explained that this elevation, hitherto treated as the summit level, is 4 feet below the lake, a fall of three-quarters of an inch to the mile being allowed for the slope necessary to discharge its waters, although, for all the purposes of navigation, that portion of the river is converted into an extension of the lake.

The dam is located between two steep hills, and its length of weir on the crest will be 1,250 feet, and abutments 650 feet. The average depth of the water in the river was at the time of the survey 8 feet, and the maximum depth, close to the southern abutment, 14 feet, the width between banks being 950 feet. With a mean flow in the river of 20,000 cubic feet per second, the thickness of water on top of the weir will be about 3½ feet.

The dam is proposed to be built of rock fill and earth backing, in all respects similar to all the other large embankments and weirs already described. Its average height above the river bottom is 61 feet, its thickness at the top 25 feet, and at the bottom 500 feet. The core of the rock portion will be made of smaller stones, gravel, and refuse from the rock cuts, with three rows of sheet piling from abutment to abutment, and substantial concrete core walls from the ends of the sheet piling carried well into the abutment hills and up along the slope beyond the maximum flood level. The upper portion and long flat apron will be composed of stones of the largest dimensions that can be properly handled and arranged, the interstices being filled from behind with small stones, gravel, and earth dumped from suitable trestles.

By this dam, slack-water navigation in the river San Juan will be obtained in the whole distance from the lake, in which, with the exception of the 28 miles above Toro Rapids, the navigable channel will be at no point less than 1,000 feet wide, with depths varying from 28 to 130 feet. Between the Lake and Toro Rapids, rock blasting under water and dredging to an average depth of 4½ feet will be required at several places, amounting in all to 24 miles, most of the rock blasting occurring at Toro. The average depth of water as raised by the dam over the shallow places, where deepening has been estimated for, is 23 feet, and the excavated channel is 125 feet at the bottom, the slopes varying with the character of the material.

A further important effect of the dam will be to raise the water of the river San Carlos to the level attained by the San Juan at their confluence above Ochoa, converting the valley of that stream into a spacious lake or port, and an integral part of the summit level and of the canal itself. Thousands of square miles of the territory of Costa Rica now inaccessible by land or water will thus become the richest portion of that Republic; and the sediment now being brought down by the rapid current of the river will then be deposited, for want of transporting power, at the mouths of the ravines and mountain torrents emptying into the basin. In fact, the area now scoured will be so much reduced that comparatively little material will be transported.

The confining ridge to the east of the valley of the San Carlos is a generally high range extending in a nearly straight line from the south abutment of the Ochoa Dam about S. 15° W. 7⅛ miles to the foot of the high mountains of the interior. The length of the ridge following its crooked crest line is about 10 miles. The hills forming the ridge do not form an unbroken range at all points higher than the level of the water which is here also maintained on 106 feet above sea level. A number of short depressions will have to be closed by embankments, the tops of which will be at an elevation of 112 feet.

The total number of embankments necessary is twenty-one. Of these eight will be very small, the ridge being now above the water line but below 112 feet. Only two will reach the floor of the valley, having a depth of 48 feet. The remaining eleven have an average depth of 19 feet. The aggregate length of embankments on crest is 5,540 feet; on floor of valley, 130 feet.

The embankments proposed will be entirely of clay, 15 feet wide on top, with slope of 3 to 1 on both sides.

It is proposed to build a large waste weir in the ridge about 2⅔ miles from the Ochoa Dam. This weir having its crest of 106 feet elevation will discharge the flood waters of the San Carlos into the San Juan independently of and below the dam.

The valley of Cureño Creek runs directly from the site of the proposed weir to the San Juan, 5½ miles below Ochoa, hence no channel for the discharged waters need be provided.

In the east side of Lake Nicaragua dredging in soft mud will be needed for a distance of about 14 miles to reach the depth of 30 feet, the average depth of the cut being 9.8 feet, and the proposed channel 150 feet wide at the bottom, with side slopes of 3 to 1 to the present bottom of the lake.

From the end of this cut to within 1,400 feet of the west coast, at the entrance of the canal, the depth in the lake varies from 30 to 150 feet. The excavation on the

west side is estimated as rock. No borings were taken on this side of the lake, but the indications on the shore and the result of the borings in the vicinity point to rock as predominating in the submarine excavation.

In view of the nature of the bottom and the prevailing winds on that coast of the lake, it has been deemed advisable, if not essential, to estimate for two crib piers or breakwaters at the entrance of the canal and extending to deep water, a distance of 1,800 feet and 2,400 feet, respectively. These piers will have the effect of arresting débris traveling along the coast by the action of the waves, insure smooth water at the entrance of the canal, and serve as guides to approaching vessels.

Western division.

[From the lake to Brito, 17.04 miles.]

This section of canal connects the lake with the Pacific Ocean. It is 17.04 miles long from the shore of the lake when at 102.5 feet above sea level, the elevation at the time the surveys were made, to the port at Brito.

As the canal is now estimated for, 11.44 miles of that distance will be wholly in excavation and 5.60 miles through a basin in the valleys of the rivers Grande and Tola.

In this basin from 30 to 70 feet of water can be had for a distance of 4,568 miles. The basin has an area of 4,000 acres, an extreme width of 12,500 feet, and an average of 5,500 feet. An alternative route has been located through the valleys proposed to be flooded, for a canal in excavation, should it be found more economical on account of the value of the land through which it passes. The only new feature of this division is the basin now introduced.

The first section begins at the mouth of the river Lajas, on the west shore of Lake Nicaragua, and follows the valley of that stream for a distance of 8,260 feet, in which the width of the canal is 120 feet at the bottom and the side slopes 1½ to 1, both in rock and earth. The river Lajas here turns to the south, and it is proposed to divert it and make it discharge into the lake a short distance south of its present mouth. The canal continues on the same straight line, crosses a plain about three-quarters of a mile wide, and enters the valley of the Guiscoyal, a small tributary of the Lajas, and at 4.70 miles from the lake it crosses the highest elevation on the line between the lake and the Pacific. This point is 42 feet above high lake, or 152 feet above mean tide in the Pacific, and is situated in a valley about 2 miles wide, deserving special mention by reason of the fact that it is the lowest depression of the main ridge between the Atlantic and Pacific Oceans on the American continent.

After crossing this divide the line gradually descends at the rate of about 9 feet per mile and in 1¾ miles further it meets the Rio Grande, a mountain stream which drains an extensive area of the western slope of the Cordillera. The line of the canal follows the tortuous channel of the Grande, cutting across some of its sharp bends or occupying the channel in short reaches. In 1½ miles it frees itself from this contracted valley and cuts across a broad plain as it turns to the westward, and enters the basin of Tola 9 miles from the lake. The distance across the basin by the sailing line is 5.504 miles. This basin is formed by the construction of an embankment 1,800 feet long and 70 feet high, resting on two high hills at a place called La Flor. The method of construction of this embankment is in all respects similar to that adopted for the construction of the Ochoa Dam and embankments in the San Francisco Valley. The rock for the fill will be obtained from the excavations for Locks Nos. 4 and 5 in the north abutment, and the earth from the canal excavation east of the basin. The level of the lake will be extended through the divide cut and the basin to this dam, the top of which is established at 112 feet above sea level. Therefore the lake will have to rise more than 2 feet above the proposed summit level before any water runs over the weir. With a length of weir of 1,300 feet and the lock culverts capable of discharging not less than 4,500 cubic feet per second, the level of the lake can be kept under control, even in extraordinary floods. Yet a guard gate is proposed in the section of canal between the lake and the divide to shut off the water from the lake in case of necessity. No special provision has been made for the control of the rivers Grande and Tola, and none is deemed necessary. These streams will flow into the summit level, one between the lake and the Tola Basin, and the other at the northern extremity of the basin. The waters will be distributed between the basin and the lake or partly used for feeding the locks, and should both rivers be in flood while the water in the basin is below the crest of the weir, and therefore most of the combined flow discharging into the lake, the current in the canal through its narrowest portion in the divide will not exceed 2 miles an hour, which can do no harm in the rock cut, while in the larger portions of the canal the velocity would, of course be proportionally less.

From the western end of the valley of Tola to Brito, the canal, after leaving Locks Nos. 4 and 5, cuts across a broad, flat country, with an inclination of about 9 feet per

mile, to the port, a distance of 2.28 miles, in which the excavation does not exceed that required for the canal prism.

These locks are proposed to overcome the difference of level between the summit and the Pacific. Locks Nos. 4 and 5 are located in the hill north of La Flor dam; their chambers are 650 feet long and 70 feet wide and the lifts 42½ feet in each. Lock No. 6, of the same dimensions of chamber, is situated 1.58 miles below, its lifts being 21 feet and 29 feet, respectively, at high and low tide. Between this lock and the port of Brito, a distance of 0.57 mile, the canal will be at the level of the sea, with an enlarged section, and may be regarded as an extension of the harbor similar to that at the Greytown end of the route.

HARBORS.

Greytown.—The observations and surveys conducted by the hydrographic party and subsequent investigations by other engineers of the company have fully confirmed the theory based on previous surveys as to the nature and magnitude of the forces which caused the destruction of this harbor and consequently the plan heretofore recommended for resisting these forces and restoring the harbor is now adhered to with but slight modifications in the details.

The plan of restoration involves the construction of a jetty or breakwater 1,700 feet long, nearly normal to the shore of the outer bar and extending to the 6-fathom curve, and dredging from this latter depth offshore across the sand bank now closing the harbor and in the inner bay. The jetty is located to the windward of the excavated channel which it is intended to shelter from the sea and protect from the wash of the waves and the traveling sands of the coast.

The first section of the jetty, extending from the shore to 15 feet of water, is proposed to be built of creosoted timber, fascinage, and stone, and that portion in deep water to be of "pierre perdue" or rubble, the stone to be obtained from the divide cut. The entrance channel is estimated to have a depth of 30 feet and a width of 500 feet at the bottom, and the inner basin is designed of sufficient dimensions to afford easy access to the canal and to accommodate a large number of vessels, its excavated area on the bottom being 206 acres, which, with the area of the enlarged section of the canal at sea level to Lock No. 1, gives a total area of 341 acres of water 28 feet deep, exclusive of slopes of 3 to 1 and the remaining portions of the inner bay not deepened, yet having in many places a depth of 20 feet, in which a large number of vessels of ordinary size can lie.

Brito.—The recent surveys have greatly added to previous information as to the natural conditions of this locality, which by reason of its being of necessity the terminus of the canal on the Pacific coast, has been spoken of as "the harbor," when, as remarked by Professor Mitchell, it is not even a roadstead. Yet the practicability of constructing a harbor at this point has not been disputed, the only difference of opinion being confined to details. The plan now proposed combines as nearly as possible the most economical form of construction with that best adapted to the physical conditions, and meets, it is believed, most effectually the objections raised against former designs.

The broad valley of the Rio Grande stretches to the coast at this point through a wide gap in the main range of hills extending along the Pacific coast. This valley, it is believed, formed once a considerable bay, but is now filled up for a distance of about 6,000 feet from the beach to about the level of high water. The proposed plan for the construction of the harbor consists, first, in a breakwater 900 feet long, extending from a rocky promontory projecting from the beach at the western extremity of the range of hills, and second, another jetty 830 feet long, normal to the beach nearly opposite the extremity of the one before mentioned. The proposed harbor will be partly in deep water confined by the jetties, but its main portion is proposed to be excavated in the alluvial valley, the whole forming a deep and broad basin penetrating 3,000 feet from the present shore line at high water and 3,900 feet from the entrance between jetties. As an extension of the harbor, the canal itself is excavated at sea level with an enlarged prism for a distance of 3,000 feet further inland, where the tide lock has been located. It is believed that with the basin as designed and the prolongation of the sea level through the canal sufficient tranquillity will be secured at the lock and in the harbor, but should this prove not to be the case an enlargement of the main basin by dredging in soft material would be a question of but comparatively small expense.

The breakwaters as estimated for are of "pierre perdue," the material to be obtained from the rocky promontory or from the western divide cut, the price allowed being on the latter basis. The harbor has an area of 95⅛ acres on the bottom or excavated portion, and with the sea-level section of the canal the total area is 103⅜ acres of water, 30 feet deep, exclusive of the slopes of 3 to 1.

MATERIALS FOR CONSTRUCTION.

As has been stated in previous reports the whole line of the canal is well supplied with timber, generally of excellent quality, though in some sections of the eastern

division it has been deemed advisable to estimate for its use only on temporary works during construction, such as trestles, laborers' dwellings, etc., the sheet piling and most of the bearing piles being imported from the Southern States and creosoted where necessary. On the western division, however, the wood growing on ground less moist is of a very superior quality and it is proposed to use it for all purposes, its durability having been amply proved in every class of construction throughout the country.

The rock proposed to be used for the dams, weirs, and breakwaters will be got from the divide cuts, which consist chiefly of basalt and various descriptions of trap of excellent quality for the purpose.

Lime of the best quality is obtainable in the western division at many places and the numerous specimens of work on which it has been used have stood the test of many generations and are to-day in a state of preservation, but it is calculated to supplement this supply with imported cement, which will be used largely in the form of concrete in the construction of locks, etc., clean sharp sand being found in great abundance in the beds of most of the streams in the vicinity of the canal.

DIMENSIONS AND CAPACITY OF THE CANAL.

In establishing the dimensions of the canal it has been my purpose to profit by the experience of the Suez Canal, where a yearly traffic of 6,000,000 tons could not be carried through without serious delays to navigation. The reduction in the length of excavated canal accomplished by the last location in Nicaragua through the substitution of free navigation in deep and broad basins for a restricted channel, gives additional facilities for the construction of a water way capable of accommodating not less than 12,000 vessels with a net tonnage of 20,000,000 a year at but a small increase cost as compared with the advantages secured, both for the commerce of the world and the economical administration of the enterprise. In fact, the immediate and prospective benefits obtained by the enlargement, in the increased facilities for passing vessels and a considerable decrease in the cost of maintenance and preservation of the work, fully justify, it is believed, the additional expense in the original cost. It will be seen on examination of the subjoined table that, of the 169.448 miles, the total length of the canal from the Atlantic to the Pacific, 121.04 miles is unimpeded navigation in the River San Juan, and in Lake Nicaragua, and 21.619 miles through basins, making a total distance of 142.659 miles in which ships can travel with little or no restriction as to speed. Of the remaining 26.789 miles, .759 is taken up by the six locks leaving but 26.030 miles of canal actually in excavation. Of this latter distance 18.189 miles are of canal large enough for vessels traveling in opposite directions to pass each other, the sectional area being in excess of the largest area of the Suez Canal. The two sections of canal with contracted prisms are in the eastern and western divide cuts; the first is 2.917 miles and the other 4.924 miles in length and located as they are almost at the extreme ends of the summit level, and in close proximity to the upper locks it is believed that the slight additional facilities to navigation secured by enlarging the dimensions of the canal in these heavy rock cuts, and the inconsiderable gain in the time of transit would not compensate for the larger outlay necessary.

Table showing the dimensions of the several sections of the proposed canal.

Section of canal.	Length.	Width, top.	Width, bottom.	Depth.	Area of prism.
	Miles.	*Feet.*	*Feet.*	*Feet.*	*Sq. feet.*
Greytown to Lock No. 1	9.297	288	120	28	5,712
Lock No. 1 to Lock No. 2 (canal)	1.258	210	120	30	4,950
Lock No. 2 to Lock No. 3 (canal)	1.65	210	120	30	4,950
Lock No. 2 to Lock No. 3 (basin)	1.762	.....	.....	*30	.....
Lock No. 3 to western end of eastern divide cut (canal)	2.917	80	80	30	2,400
Lock No. 3 to western end of eastern divide cut (Desecado basin)	3.086	.....	.....	*45	(†)
Western end of divide cut to Ochoa (canal)	1.233	184	80	30	3,673
Western end of divide cut to Ochoa (San Francisco basin)	11.267	.....	.....	40	(†)
River San Juan to Toro Rapids	37.040	.....	.....	*52	(†)
River San Juan where dredging is needed	27.500	.....	125	*28	(†)
Lake Nicaragua	56.500	.....	150	*50	(†)
Lake to western divide cut (canal)	1.565	210	120	30	4,950
Western divide cut (canal)	4.924	80	80	30	2,400
Divide cut to east end of Tola basin (canal)	2.519	184	80	30	3,673
East end of Tola basin to Lock No. 4 (basin)	5.504	.....	.....	*50	(†)
Lock No. 5 to Lock No. 6 (canal)	1.582	184	80	30	3,673
Lock No. 6 to harbor of Brito, (canal)	.570	288	120	28	5,712

* Mean. † Undetermined.

RECAPITULATION.

	Miles.
Canal in excavation, east side	14.870
Canal in excavation, west side	11.160
Six locks, both sides	.759
Total canal in excavation	26.789
Basins of the Deseado	4.848
Basin of the San Francisco	11.267
Basin of the Tola	5.504
Total length of basins	21.619
River San Juan	64.540
Lake Nicaragua	56.500
Total natural water ways	121.040
Total length of canal (from the Atlantic to the Pacific)	169.448

In the lake and in the greater part of the River San Juan vessels can travel with unrestricted speed, and in some sections of the river and in the basins, although the channel is at almost all points deep and of considerable width, yet the speed will be somewhat checked by reason of the curves.

Official reports show that, in the Suez Canal, steamers of 4,400 tons can travel at an average speed of 6 statute miles per hour, and that smaller vessels travel through the canal at the rate of from 6 to 8 miles an hour. On this basis the following estimate of the time of transit has been prepared:

Estimated time of through transit by steamer.

	H.	M.
26.030 miles of canal, at 5 miles an hour	5	12
22.619 miles in three basins, at 7 miles an hour	3	05
64.540 miles in the River San Juan, at 8 miles an hour	8	04
56.500 miles in Lake Nicaragua, at 10 miles an hour	5	39
Six lockages at forty-five minutes each	4	30
Allow for detentions in narrow cuts	1	30
Total time of transit	28	00

The traffic of the canal will be limited by the time required for a vessel to pass a lock, and on the basis of forty-five minutes, and that but one vessel will pass in each lockage, the number of vessels that can pass through the canal in one day will be 32 or in one year 11,680, which at the average tonnage of vessels going through the Suez Canal, will give an annual traffic of 20,440,000 tons. This estimate is on the assumption that the traffic will not be stopped during the night, for with abundant water power at the locks and at the basins the whole canal can be economically illuminated by electricity, and with beacons and range lights in the lake and river there seems to be no good reason why vessels should not travel day and night with perfect safety, and the outlay necessary for the illumination has consequently been included in the estimates.

Water supply.

Lake Nicaragua has a surface area of about 2,600 square miles, and a watershed of not less than 8,000 square miles. Gauges of its outlet, the River San Juan, at its lowest stage between the lake and Toro Rapids showed a minimum flow of 11,390 cubic feet per second. Colonel Childs estimated the discharge with full lake in the wet season at 18,059 cubic feet per second, which gives a mean flow of 14,724 cubic feet per second, or 1,272,530,600 cubic feet per day.

Water required for lockage.

	Cubic feet.
Water required for one lockage:	
On the east side	2,047,500
On the west side	1,933,750
On both sides	3,981,250
Water required for 32 lockages per day	127,400,000

This gives a daily excess for the lake supply *only* of 1,144,753,600 cubic feet.

To the latter amount must be added the flow of the several tributaries of the San Juan River between the lake and the Ochoa dam, and also the tributaries of the basins forming part of the summit level, which would fully compensate for leakage and evaporation.

It is expected that considerable leakage will take place at the rock-fill dams and embankments before they consolidate and become tight, but this may well be accepted as a desirable condition to aid in gradually disposing of the surplus water without a large discharge over the weirs.

The above statement shows that the lake discharge is abount ten times larger than the maximum amount needed for the canal, and it may be safely estimated that for many years after the canal is opened for traffic, the surplus from that source alone will be double that amount, while at the confluence of the rivers San Juan and San Carlos, above the Ochoa dam, the excess may even reach forty times the quantity needed for the canal. It is evident, therefore, that as long as the summit level can be maintained at the required elevation, the leakage through the rock fills, acting as safety valves, may be regarded as an element of security rather than one of danger, especially as the tightening of the dam can be regulated by depositing suitable material on the upstream side or by dumping more stone on the lower slopes or on the crest, so as to preserve the desired elevation of the surface of the water.

ESTIMATES.

The estimate of the cost of the canal, submitted with this report, is the result of careful computations of all the works required for the completion of the canal and its accessories, based upon the data obtained by the last location with numerous borings along the whole route. Where no rock was met with the borings were carried to the bottom of the canal, and all material which the auger or hand drills could not penetrate has been assumed to be, and estimated for, as rock. The result is a much larger amount of rock in proportion to the cube to be removed than had been estimated before; and although the length of canal in excavation has been reduced by 13.5 miles and the total amount of excavation by 3,567,565 cubic yards, in that portion covered by the report of 1885, yet the cost of that item of expense is now put down at $31,936,136.05 as compared with $33,447,338.80, in 1885. It is believed that when a more effective system of drilling is applied in certain portions of the line a much smaller amount of actual work will be found than now appears on the estimate. In the meantime the error, if any, is made on the safe side. The eastern "divide cut," of but less than 3 miles in length, is represented in the estimate with 7,000,230 cubic yards of rock in place and 22 per cent of the cost of the whole work, and reference has been made, in describing the eastern division, to the existing facilities for doing this work and to the several purposes to which the material to be removed can be advantageously applied in the construction of the canal for the expense of transportation alone.

In the western division the excavation in rock through the divide cut is estimated at 5,696,507 cubic yards in a distance of 9 miles, but that work presents no serious difficulties, the maximum depth of excavation being only 42 feet above the surface of the water in the canal, and the mean only 20 feet, with ample facilities for disposing of waste material not needed for the construction of the breakwaters, the locks, the embankments, and pitching the slopes of the canal.

A comparison of the figures given in the estimate with those of the 1885 report discloses what at first sight appears to be an inconsistency, viz, an increase in the total estimated cost of the canal of $1,047,978.25, and a decrease in the length of actual canal to be excavated of 13.5 miles, and in the cube to be removed of 3,567,565 cubic yards, as stated before. It will, however, be observed that the surveys made by the expedition of 1885 were confined exclusively to the land portions of the canal, the estimates for the other portions being based on previous incomplete hydrographic surveys, while the recent location, covering, as it does, the whole line from ocean to ocean, has produced the following results:

First. A reduction of the quantities in all the sections actually located by the 1885 expedition, by the introduction of basins, etc., and certain modifications in detail in the location, thus: 54,015,602 cubic yards excavation in canal proper in 1885 report, and 50,448,037 cubic yards by present estimate, a difference of 3,567,565 cubic yards in favor of the new location; though, with regard to cost, this has been more than balanced by the increase in the proportion of rock now estimated, as already explained.

Second. In all the work connected with the lake and harbor of Greytown the increase in consequence of the more accurate data now obtained is, for excavation in the lake 4,902,908 cubic yards, against 877,675 cubic yards in 1885, and in the harbor of Greytown 9,550,000 cubic yards, against 4,080,100 cubic yards. Besides the addition of certain other improvements, which have been spoken of in the body of this report, fully explaining the apparent contradiction between the claims and the results of the

recent expedition, and giving further evidence of its extensive scope as well as its minute attention to detail, making it, as claimed, an improved location, the estimated cost only increased by more accurate knowledge of the country and conditions.

Of the 26,789 miles of canal in excavation, more than 12 miles will be done by dredging, the material to be deposited directly on both sides of the cut, and the short cuts in the San Francisco division, amounting in the aggregate to 1¼ miles, are subdivided in small sections across narrow ridges separating deep valleys, where the excavated material not needed for embankments, can be dumped in the immediate vicinity.

A railroad has been estimated for from Lock No. 1 to the dam at Ochoa, and between Lake Nicaragua and the Pacific, which, together with the lake and river and the smaller streams penetrating into the valleys of the Deseado and San Francisco, will afford easy and economical communication along the whole route. These small streams will be of special value at the start, as they proved to be in the prosecution of the surveys. It is admitted that the prices adopted in estimating the cost of this work should be greater than would be required for similar work located in any well-developed section of this country. A large percentage of the increased cost is chargeable to the transportation of tools and machinery, and to the difficulty in obtaining and providing for the workmen, the country from Greytown to the lake being uninhabited, and that between the lake and Brito but sparsely populated. The erection of houses for the protection of the property and accommodation of employés will be a necessary item of expense; but the country is exceptionally healthy, and these structures need not be either substantial in character or expensive. The majority need be but temporary sheds built with material gathered along the line of the canal, at but little more cost than the labor in handling it; yet, some delay and expense may be found unavoidable in the preliminary preparations for commencing the work.

Another contingency which may cause a marked increase in the cost of the work is the physical inability of the imported workmen to perform the ordinary labor, as compared with that accomplished in a more temperate climate. The laboring classes of Nicaragua, when under proper control, are capable of an activity and endurance under great fatigue and exposure to the elements scarcely equaled in any other country, and with no apparent injury to health; yet the same capabilities can not be expected in unacclimated foreigners, accustomed to different conditions of life. It is believed that not less than 6,000 excellent laborers can be obtained from the Central American States, and that with a judicious management all the help needed can be had from the Gulf States in this country, where the climatic conditions are in many respects similar to those prevailing over a large portion of the canal route. The number of skilled laborers employed will be comparatively small. On the west side of the lake, where the greater number of laborers will be employed, the climate is not excelled for salubrity by any other portion of Central America, and in that portion of the eastern section from Ochoa to Greytown, which is the only locality where trouble from climatic causes might be expected, the unexceptional good health enjoyed by the employés of the company during more than six months of constant exposure to the influence of the climate, while undergoing all kinds of hardships and privations, seems to be an evident demonstration that no apprehensions need be entertained as to the climate. It will be observed that in this section the work is divided into two large classes, viz, the divide cut and dredging. The first is located in the most elevated and healthy portion of the line, and in the second the number of employés is reduced to a minimum, as manual labor is almost entirely excluded. The small force necessary to handle and care for the machinery will be either housed on the dredges or in quarters in the "divide" where, with the purest of waters from the mountain streams and the cool "trades" constantly sweeping in from the sea, the slightest sanitary regulations will insure perfect health at all times.

The prices adopted are believed to be ample to cover all possible contingencies, provided the work is conducted by an intelligent and business-like management.

It is estimated that the canal can be completed in six years, of which time one year will be expended in marking out the line, and clearing the ground, and in making the necessary preparations to commence active operations.

CONCLUSION.

In closing this report I beg to express my firm convictions, the result of several years of constant labor and careful investigations, that the route here described and recommended is perfectly practicable, free from complicated engineering problems, and the most economical as well as the safest for interoceanic ship communication between the Atlantic and Pacific Oceans, across the American Isthmus.

In making this location the information obtained by previous surveys and explorations has been utilized with much saving of time and labor, and has greatly con-

tributed to the thorough knowledge of the country traversed by the canal now in possession of the company; and it may be safely stated that the present location can not be materially improved upon.

I take pleasure in expressing my high appreciation of the valuable services rendered by the officers of the expedition, to whose untiring energy and devotion to duty, under many adverse conditions, is due the success of the surveys. With such a large and efficient staff in which the prevailing sentiment of each seems to have been to excel in the discharge of his duties, it is not in my power to make individual references to merit, but my sincere thanks are extended to all; yet I feel confident I can make two exceptions with the unanimous approval of all concerned.

Subchief R. E. Peary, on whom devolved the onerous duty of taking the surveying expedition to Nicaragua, displayed from the moment of his arrival in the country the most untiring energy, perseverance, and ability in the proper management and distribution of the force under his charge, and in pushing the work forward, deserving the highest commendation. After I took charge of the work his coöperation was equally valuable.

The other is Mr. J. Francis Le Baron, who has been for the last six months in charge of the surveying parties left in Nicaragua, and has rendered very valuable services in completing and perfecting the location of certain portions of the route, where additional information was deemed necessary.

The medical corps rendered most important services both in attending to the sick and in giving preventive advice, which proved both valuable and effective. It shared also in the field work and in the draughting at headquarters.

Respectfully submitted.

A. G. MENOCAL,
Chief Engineer.

ESTIMATES OF COST ON LOCATION OF 1887–1890.

EASTERN DIVISION, 18.864 MILES.

[From Greytown to the eastern limit of the San Francisco Basin.]

Section 1—From Greytown to the Divide, 15.947 miles.

1,819,820 cubic yards excavation in earth above water, at 40 cents	$727,928.00
13,547,597 cubic yards dredging, at 20 cents	2,709,519.40
172,288 cubic yards stone pitching sides of canal, at $2	344,576.00
925 acres grubbing and clearing, at $100	92,500.00
Lighting canal (at one-half mile intervals), 24 incandescent electric beacons and plant	67,000.00
Lighting locks, 30 electric arc lights, with separate dynamos for each lock	9,000.00
	$3,950,523.40

Section 2—The Divide, 2.917 miles.

7,000,230 cubic yards excavation in rock, at $1.50	10,500,345.00
3,034,904 cubic yards excavation in earth, at 40 cents	1,213,961.60
169 acres grubbing and clearing, at $100	16,900.00
Lighting canal (at one-half mile intervals), 6 incandescent electric beacons and plant	8,500.00
11,600 lineal feet of narrow section of canal, to receive double fender wales each side, at $4	46,400.00
	11,786,106.60

Railroad and telegraphs.

12 miles railroad from Lock No. 1 to San Francisco Basin, at $60,000.	720,000.00
22 miles telegraphs, Greytown to San Francisco Basin, at $500	11,000.00
	731,000.00

Lock No. 1.

463,603 cubic yards excavation in earth, at 40 cents	$185,441.20
120,044 cubic yards concrete (rock obtained from the Divide Cut), at $6	720,264.00
2,400 cubic yards stone pitching in basin, at $2	4,800.00
3,699 cubic feet fender wales, at 50 cents	1,849.50
1,020 fender piles 45 feet long, at $13.50	13,770.00
Gates	114,934.40
Machinery	100,000.00
Buildings	30,000.00
Pumping	100,000.00
	1,271,059.10

Lock No. 2.

308,918 cubic yards excavation in earth, at 40 cents	123,567.20
120,430 cubic yards concrete (rock obtained from the Divide Cut), at $6	722,580.00
2,400 cubic yards stone pitching in basin, at $2	4,800.00
3,699 cubic feet of fender wales, at 50 cents	1,849.50
1,020 fender piles 45 feet long, at $13.50	13,770.00
Gates	114,934.40
Machinery	100,000.00
Buildings	30,000.00
	1,111,501.10

Lock No. 3.

528,673 cubic yards excavation in earth, at 40 cents	211,469.20
147,627 cubic yards concrete (rock obtained from the excavation,) at $6	885,762.00
32 fender cribs, at $500	16,000.00
Gates	188,440.00
Machinery	100,000.00
Buildings	30,000.00
	1,631,671.20

Harbor of Greytown.

Brush and pile pier, 900 feet long	190,214.50
225,907 cubic yards stone in breakwater (from Divide Cut), at $1.50	338,860.50
9,550,000 cubic yards dredging in sand, at 20 cents	1,910,000.00
Piers at entrance to canal	100,000.00
Lighting and buoying:	
One first-order lighthouse complete	100,000.00
Three range beacon lights	1,000.00
One breakwater beacon light and signal tower	7,000.00
Two pier-head lights	2,000.00
One first class (middle channel) Nun buoy	200.00
Two second class (side channel) Nun buoys	200.00
Two third class (side channel) Nun buoys	100.00
	2,649,575.00

Auxiliary Works.

105,500 cubic yards dredging in earth and sand in diversion of Deseado, at 20 cents	21,100.00
Embankment and weirs in valley of the Deseado:	
210,625 cubic yards rock fill (from the Divide Cut), at 40 cents	84,250.00
836,329 cubic yards earth in embankments and backing of weirs, at 30 cents	250,898.70
79,658 cubic yards excavation of surface soil for embankments, at 40 cents	31,863.20
5,100 lineal feet of sheet piling, 30 feet long 8 inches thick, say 1,350,000 feet B. M., at $70	94,500.00
250,000 feet B. M. timber for cross-ties and guides for sheet piling, etc., at $60	15,000.00
200 bearing piles for trestles and guides to sheet piling, at $10	2,000.00
2,500 lineal feet of trestles, for dumping stone, etc., at $22	55,000.00
	554,611.90

RECAPITULATION, EASTERN DIVISION.

Section 1, from Greytown to the Divide	$3,950,523.40
Section 2, the Divide	11,786,106.60
Railroad and telegraphs	731,000.00
Lock No. 1	1,271,059.10
Lock No. 2	1,111,501.10
Lock No. 3	1,631,671.20
Harbor of Greytown	2,649,575.00
Auxiliary Works	554,611.90
	23,686,048.30

SAN FRANCISCO DIVISION, 12.500 MILES.

[From the western end of the eastern "divide cut" to the River San Juan.]

725 acres clearing trees from line of canal, at $100	72,500.00
30,309 cubic yards excavation in rock, at $1.50	45,463.50
2,698.195 cubic yards excavation in earth, at 40 cents	1,079,278.00
Lighting canal at one-half mile intervals, 24 incandescent electric beacons and plant	65,000.00
Guard gate or movable dam to control waters of the San Juan	300,000.00
	1,562,241.50

Railroad and telegraphs.

15 miles railroad at $60,000	900,000.00
40 miles telegraphs, from Divide to Castillo, at $500	20,000.00
	920,000.00
Embankments and weirs in the valley of the San Francisco:	
3,239,705 cubic yards earth in embankments from canal excavation, at 30 cents	971,911.50
1,575,459 cubic yards rock fill from the "divide cut," at 40 cents	630,183.60
192,415 cubic yards excavation of surface soil for embankments, at 50 cents	96,207.50
12,600 lineal feet of sheet piling 40 feet long 8 inches thick, say 4,500,000 feet B. M., at $70	315,000.00
1,458 guide piles for sheet piling and for bearing trestles, average 30 feet long, at $8	11,664.00
524,000 feet B. M., of timber in guides and cross-ties for sheet piling, etc., at $60	31,440.00
27,585 lineal feet of trestles for dumping rock and carrying railroad, at $22	606,870.00
178 acres grubbing and clearing for embankments at $100	17,800.00
	2,681,076.60

RECAPITULATION, SAN FRANCISCO DIVISION.

Excavation, lighting, clearing, etc	1,562,241.50
Railroad and telegraphs	920,000.00
Embankments and weirs in valley of the San Francisco	2,681,076.60
	5,163,318.10

LAKE AND RIVER DIVISION, 121 MILES.

[From Ochoa to the western shore of Lake Nicaragua at the mouth of the Rio Lajas.]

Section 1—*Rio San Juan*, 64.5 *miles.*

398,613 cubic yards excavation in rock under water, at $5	1,993,065.00
422,540 cubic yards excavation in earth above water, at 40 cents	169,416.00
2,150,900 cubic yards dredging in earth at 30 cents	645,270.00
377 acres grubbing and clearing across bends at $100	37,700.00
Lighting and buoying:	
10 middle channel spar buoys (Fort San Carlos to Toro), at $25	250.00
80 western river light beacons, at $50	4,000.00
One electric arc lamp in signal tower at Dam	3,000.00
Three incandescent electric light beacons, at Dam basin	1,000.00
70 miles telegraphs, at $500	35,000.00
	2,888,701.00

Section 2—Lake Nicaragua, 56.5 miles.

176,832 cubic yards submarine rock excavation (west shore of lake), at $5	$884,160.00
4,726,076 cubic yards dredging (east side of lake), at 20 cents	945,215.20
Lighting and buoying:	
One fourth-order lens in signal tower at mouth of Rio Lajas	7,000.00
One 2-mile range beacon	100.00
One fourth-order lens in keeper's dwelling at end of Solentiname Island	9,000.00
One second-order lens on hill, old Fort San Carlos	80,000.00
One fourth-order range light in signal tower, old Fort San Carlos	7,000.00
One second-class (middle channel) nun buoy at mouth of Lajas	100.00
Two third-class (side channel) nun buoys at mouth of Lajas	100.00
Five third-class (middle channel) nun buoys at entrance Rio San Juan	150.00
	1,857,825.20

Dam across Rio San Juan at Ochoa.

18,500 cubic yards excavation in earth, at 40 cents	7,400.00
1,550 cubic yards concrete in core walls of abutments, at $10	15,500.00
830 bearing piles for trestles and sheet piling 45 feet long, at $13.50	11,205.00
3,330 lineal feet of sheet piling, 30 feet deep by 8 inches thick, 800,000 feet B. M., at $75	60,000.00
1,180,000 feet B. M. of timber in trestles, guides for sheet piling, cross ties, etc., at $60	70,800.00
807,920 cubic yards rock fill (from divide cut), at 50 cents	403,960.00
629,090 cubic yards earth filling from excavation at 25 cents	157,272.50
	726,137.50

Embankments on San Carlos Ridge line.

293,240 cubic yards earth in embankments (borrowed), at 70 cents	205,408.00
22,370 cubic yards excavation of surface soil, at 50 cents	11,185.00
450 lineal feet sheet piling 40 feet long, 8 inches thick, 144,000 feet B. M., at $70	1,510.00
45 guide piles for sheet piling, averaging 30 feet long, at $8	360.00
18,000 feet B. M. of timber in guides and cross-ties for sheet piling, etc., at $60	1,080.00
3½ acres grubbing and clearing for embankments, at $100	350.00
	219,893.00

RECAPITULATION, LAKE AND RIVER DIVISION.

Section 1, River San Juan	2,888,701.00
Section 2, Lake Nicaragua	1,857,825.20
Embankments in San Carlos Ridge Line	219,893.00
Dam across Rio San Juan at Ochoa	726,137.50
	5,692,556.70

WESTERN DIVISION, 17.04 MILES.

Section 1.—From Lake Nicaragua to Briton 17.04 miles.

5,696,507 cubic yards excavation in rock above water, at $1.25	7,120,633.75
5,399,316 cubic yards excavation in earth above water, at 40 cents	2,159,726.40
1,066,666 cubic yards dredging in sand, at 20 cents	213,333.20
20,753 cubic yards stone pitching sides of canal, at $2	41,506.00
1,033 acres grubbing and clearing, at $50	51,650.00
Lighting 20 incandescent electric beacons and plant	54,000.00
30 electric arc lights and two separate dynamos at locks	9,000.00
26,000 lineal feet of narrow section of canal to have double fender wales each side, at $4	104,000.00
	9,753,849.35

Diversion of the Rio Lajas into the lake.

249,508 cubic yards excavation in earth, at 40 cents	$99,803.20
164,786 cubic yards excavation in rock, at $1.25	205,982.50
	305,785.70

Railroad and telegraphs.

18 miles narrow-gauge railroad, at $25,000	450,000.00
18 miles telegraphs, at $500	9,000.00
	459,000.00

La Flor dam.

17 acres grubbing and clearing, at $50	850.00
320,000 cubic yards excavation of surface soil, at 40 cents	128,000.00
3,320 lineal feet of sheet piling in two rows, 30 feet long, 8 inches thick, 796,800 feet B. M., at $75	59,760.00
322 bearing piles for trestles and guiding sheet piling 20 feet long, at $5	1,610.00
50,000 feet B. M. of lumber for guides and cross-ties for sheet piling, at $50	2,500.00
1,600 lineal feet of trestles for dumping material, at $22	35,200.00
918,000 cubic yards earth from canal excavation, at 20 cents	183,600.00
830,000 cubic yards rock fill from excavation for locks, at 20 cents	166,000.00
	577,520.00

Locks Nos. 4 and 5.

664,194 cubic yards excavation in rock, at $1.25	830,242.50
127,646 cubic yards excavation in earth, at 40 cents	51,058.40
100,000 cubic yards concrete (rock from the excavations), at $6	600,000.00
1,020 fender piles, at $13.50	13,770.00
3,699 cubic feet fender wales, at 50 cents	1,849.50
2,400 cubic yards stone pitching in basin, at $2	4,800.00
Gates	250,000.00
Machinery	150,000.00
Buildings	45,000.00
	1,946,720.40

Tidal Lock No. 6.

61,698 cubic yards excavation in rock, at $1.25	$77,122.50
124,800 cubic yards excavation in earth, at 40 cents	49,920.00
126,000 cubic yards concrete (rock obtained from the Divide Cut), at $6	756,000.00
1,020 fender piles, at $13.50	13,770.00
3,698 cubic feet of fender wales, at 50 cents	1,849.00
2,400 cubic yards stone pitching in basin, at $2	4,800.00
Gates	114,934.40
Machinery	100,000.00
Buildings	30,000.00
Pumping	100,000.00
	1,248,395.90

Other Auxiliary Work.

Guard gate or movable dam in the Divide	300,000.00
Crib piers at lake entrance to canal	493,710.00
Three swinging bridges over canal	60,000.00
189,016 cubic yards embankment near site of locks, at 50 cents	94,508.00
19,080 cubic yards masonry walls at head of Lock No. 4, at $10	190,800.00
	1,139,018.00

Harbor of Brito.

5,658,898 cubic yards dredging, at 20 cents	$1,131,779.60
383,899 cubic yards stone in breakwaters (stone from Divide Cut), at $1.50	575,848.50
Lighting and buoying 1 second order lens in signal tower on promontory	10,000.00
One range light beacon, inner base of promontory	100.00
Two pier-head lights	2,000.00
One first class (middle channel) Nun buoy	200.00
Four third class (side channel) Nun buoys	200.00
	1,720,128.10
Right of way indemnity	100,000.00

RECAPITULATION, WESTERN DIVISION.

Section 1, canal	9,753,849.35
Diversion of the Rio Lajas into the lake	305,785.70
Railroads and telegraphs	459,000.00
La Flor dam	577,520.00
Locks Nos. 4 and 5	1,946,720.40
Tidal Lock No. 6	1,248,395.90
Other auxiliary works	1,139,018.00
Harbor of Brito	1,720,128.10
Right of way indemnity	100,000.00
Tipitapa Canal	275,000.00
	17,525,417.45

GRAND RECAPITULATION.

Eastern division	$23,686,048.30
San Francisco division	5,163,318.10
Lake and river division	5,692,556.70
Western division	17,525,417.45
	52,067,340.55
Surveys, hospitals, shops, management, and contingencies, 25 per cent	13,016,835.45
Grand total	65,084,176.00

Respectfully submitted.

A. G. MENOCAL,
Chief Engineer.

[NOTE.—Jan. 31, 1890 These estimates bave been revised to conform to information obtained to date.]

APPENDIX H.

NICARAGUA CANAL CONSTRUCTION COMPANY.

REPORT OF THE BOARD OF CONSULTING ENGINEERS MAY 9, 1889.

To the Nicaragua Canal Construction Company:

GENTLEMEN: The undersigned were requested by your letter of January 10, 1889, to examine the plans and estimates prepared by your chief engineer, Mr. A. G. Menocal, for a ship canal between the two oceans at Nicaragua, and to indicate the cost, in their judgment, of constructing a canal along the line proposed and following, in general, the plans of your chief engineer. You also requested an opinion upon the practicability of the canal as now proposed, with due reference to the end in view, namely, the safe and convenient passage of sea-going ships from ocean to ocean. We beg to present the following report:

We have carefully examined the unusually full maps, profiles, borings, samples of materials, etc., which have been prepared and collected under the directions of your chief engineer, and the completeness and excellent form of which reflect credit upon your engineering staff.

We find certain elements of the designs submitted which may probably be advantageously modified. This would in some cases reduce and in others increase the quantities. It is also altogether likely that some parts of the work may be let at lower and other parts at higher prices than are estimated. We, however, are disposed to base our conclusions on quantities and prices which should prove sufficient to accomplish it upon the assumption of good and honest management, backed by an ample treasury. We have necessarily borne in mind the fact that the cost of the notable precursors of this canal project, both at Suez and Panama, has greatly exceeded the amount of the original estimates, and that this has been true of many other important works. While this might be, perhaps, in a large measure traced to unfortunate management, as well as the lack of such careful preliminary studies as have been laid before us in this case, we have nevertheless endeavored to guard against a similar result by a liberal allowance for every apparent contingency.

Acting on this principle, we have not yet deemed it wise to reduce the quantities or prices of your chief engineer's estimates in any instance, even when it appeared possible that this might prudently be done. His figures are, of course, founded upon a better knowledge of the local conditions than we can now possess. But to the extent to which it has appeared at all doubtful we have liberally increased one or both. Our conclusions are as follows:

The project, as a whole, appears to have comparatively few elements of doubt about it, as contrasted with other works of at all similar magnitude, and we consider it to be unquestionably feasible. The great area of Lake Nicaragua offers immunity from serious floods by regulating flow. Much of the earth excavation and dredging, the rock drilling, and the concrete mixing can be done by mechanical means, to that extent reducing the need for manual labor. The dams and embankments are proposed to be made largely from the immense mass of otherwise useless rock spoil. Under the climatic conditions, as we understand them, an adequate supply of labor should be obtainable. The project in detail consists of the following elements:

First. Of 10 miles on the east end and 0.57 miles on the west end of sea-level canal dredged in from the coast. The borings submitted seem to warrant the opinion that this will be entirely through alluvial deposits, as is also the case in certain parallel river diversions. The samples of material taken from these borings all appear favorable for dredging and the cost of such dredging can be foreseen with the greater precision, because less influenced by climate, weather, and rates of wages than most other engineering work.

Second. Of a flight of three locks on each end, all within a distance of about one

and one-half miles at one end and two miles at the other, by which the ascent is made from the sea-level to the summit-level of 110 feet (this elevation being some four feet less on the eastern end to allow for a necessary fall of three-fourths of an inch per mile in the San Juan River). These locks are shown by the borings submitted to be all founded on rock. The proposed size for locks, 650 feet by 70 feet by 30 feet deep, seems sufficient for all demands.

Third. Of a very long summit level of 155.98 miles, consisting of four main parts:

(*a*) The great divide cuts of 3 and 8 miles in length, respectively, which are shown by the evidence submitted, to consist chiefly of rock, overlaid with a few feet of earth.

(*b*) The Deseado, San Francisco, Michado, and Tola basins formed by dams, furnish 21.57 miles of slack-water navigation, 18.13 miles of which require no excavation and the remaining 3.44 miles earth dredging only.

(*c*) The river San Juan, raised in level by a dam at Ochoa, so as to furnish slack-water navigation, and Lake Nicaragua furnish together 121 miles of free navigation of which 36.5 miles require some earth dredging and 3.83 miles some rock dredging.

(*d*) An inconsiderable amount (1.63 miles) of canal section in earth, chiefly to connect the San Francisco and Machado basins.

The two great rock cuts are by far the heaviest features of the work. In considering the plans for them and determining the proper amount and cost of work we have felt that every provision should be made to secure permanent slopes and to provide a section suitable for any vessels which can pass the locks. We think that the estimates, as modified by us, will secure these results.

The four great basins present a most admirable feature of the plans. As compared with a restricted canal channel, they facilitate navigation as well as reduce the cost. They are made, as is also the slack-water navigation of the San Juan River, by dams and embankments of considerable extent, none, however, of very great height. The plans submitted provide for forming these dams and embankments chiefly of heavy rock filling, the proximity of the great rock cuts (from which material must otherwise be wasted) to the sites of these dams and embankments facilitating their permanent construction at moderate cost. While we are not ready to say that the details of the plans submitted may not be, in some respects, modified, we regard the estimates adopted as sufficient to attain the results desired, subject to the following contingency:

There is the possible hazard in respect to the San Francisco and other basins, that they may not prove sufficiently retentive, owing either to leakage around the ends or under the bases of the dam and embankments, or to conceal permeable strata beneath the natural surface. We deem this a remote danger since both the surface and subterranean formations, so far as revealed by borings and by the reports of the observations of reliable men, familiar with the locality, are favorable.

For a work of ordinary magnitude we would accept such evidence as ample, but in view of the great area and volume of the basins, we agree that the possibility ought to be covered by the estimate. The probability is great that there are no permeable strata beneath the surface; if they exist they might not necessarily cause leakage, and even if leakage resulted, it would not necessarily do serious harm. Concentrated leakage if it occurred might possibly be remedied, and if it should develop at all would be likely to occur at an early stage of the work of construction. The worst result to be feared is that it might impel a modification of the original features of the project, enforcing a lowering of the water level at certain points, and at an additional cost of about $7,000,000. Under the circumstances, we, out of abundant caution, have deemed it wise and right to make the general contingency of allowance ($14,633,262) large enough, in our opinion, to cover this amount.

The requisite depth in the San Juan River and in Lake Nicaragua is obtained by a considerable amount of dredging, largely of earth but also with an amount of rock blasting under water, the precise extent and cost of which it is exceptionally difficult to foresee. We have therefore made an allowance for this work.

We have included in the estimates the sum of $1,035,000, for the diversion of the Rio Grande, as it seems proper to provide for the possible necessity of the diversion of this important stream from the canal. We have also included in the estimate the amount named by the chief engineer for the work that may be necessary in the valley of the San Carlos and in the construction of the canal between Lake Managua and Lake Nicaragua, this construction being a requirement of the concession.

The estimates for the harbor improvements at Brito and Greytown we leave unchanged. It appears probable that the amounts estimated may prove ample for all requirements other than gradual enlargement of basin areas, but whether so or not (and it is always extremely difficult to anticipate with certainty what may be the ultimate requirements for work of this class), we do not see the necessity in this work as we do in the canal proper for the endeavor to provide at the outset for all future demands of commerce. Sufficient expenditure prior to the opening of the canal to meet reasonable requirements for the first year or two after opening is all that we

have taken into consideration in our estimates. The canal once opened adequate harbors can certainly be provided at a moderate percentage on the total cost of the canal, even should the sum herein estimated for harbors and contingencies prove insufficient. We must not be understood as implying by this statement, however, that we now see reason to fear that the present estimate for harbor work will probably prove inadequate. Such is not the fact.

It may not be regarded as improper to mention also that while the cuts, locks, dams, etc., should be completed for the full depths at the outset, something like one-fifth of the total amount of the estimate is for dredging and earth excavation under water, which is not required to afford 20 feet draught, and which can be completed with little or no disadvantage after the canal has been so far constructed as to pass vessels of that draught, making it possible—if found advisable—to open the canal for 20 feet draught for about four-fifths of the final cost.

Our estimate, which is intended to represent the maximum sum which the canal ought to cost, assuming, as aforesaid, integrity, good management, and no interruption of work from financial or other causes, is as follows:

Auxiliary railways, double track, standard gauge, from divide cut east to Greytown, and from divide cut west to Ochoa Dam, 20 miles, and telegraph, temporary and permanent systems		$1,110,000
Same on Pacific slope, Rio Lajas to Brito, 18 miles		459,000
		1,569,000
Harbor works, Greytown	$2,550,667	
Harbor works, Brito	1,720,128	
		4,270,795
Eastern division:		
Section 1, from Greytown to the divide		5,298,527
Section 2, the eastern divide		18,333,639
Locks Nos. 1, 2, and 3		4,195,828
Diversion of the Deseado and San Juanillo		982,016
San Francisco division		5,411,551
Lake and river division:		
Rio San Juan		3,685,701
Lake Nicaragua		2,211,825
Dam at Ochoa		726,137
Western division:		
From Lake Nicaragua to the Pacific		12,133,849
Diversion of Rio Lajas		346,786
La Flor dam		577,520
Locks 4, 5, and 6, and guard gates		3,899,116
Right of way indemnity		100,000
Auxiliary work—guard gates in divide, piers at lake, bridges, etc		1,139,018
Embankments and weirs in the valley of the San Carlos and canal between Lake Managua and Nicaragua		1,000,000
Diversion of the Rio Grande		1,035,000
For engineering, management, labor agencies, shops, police, sanitary service, and incidentals		6,250,000
		73,166,308
Add to cover specified and unspecified contingencies of construction, 20 per cent		14,633,262
Grand total of estimate		87,799,570

In conclusion, we think it proper to express our opinion that the exploration and studies of the region have been sufficient to warrant the conclusion that, unless hindered by obstacles or sinister influences such as would, if permitted to weigh, forbid the success of all ventures, this enterprise is full of promise.

Respectfully,

JOHN BOGART.
E. T. D. MYERS.
A. M. WELLINGTON.
H. A. HITCHCOCK.

I concur in the foregoing estimates as being in the aggregate ample for the purposes stated.

CHAS. T. HARVEY.

MAY 9, 1889.

APPENDIX I

CONCESSION AND DECREES OF THE REPUBLIC OF NICARAGUA TO THE NICARAGUA CANAL ASSOCIATION OF NEW YORK.

The President of the Republic to the inhabitants thereof:

Know ye that Congress has ordered as follows:

The senate and chamber of deputies of the Republic of Nicaragua do hereby decree—

ONLY ARTICLE.—The contract for a maritime interoceanic canal entered into the 23d of March, ult., between Dr. Adan Cárdenas, commissioned especially by the supreme government, and Mr. A. G. Menocal, member and representative of the Nicaragua Canal Association organized in New York, is hereby ratified. This contract shall be a law of the Republic if Mr. Menocal accepts it as soon as he be notified, with the following modifications and upon the following terms:

The undersigned, Adan Cárdenas, commissioner of the Government of the Republic, party of the first part, and Aniceto G. Menocal, representative of the Nicaragua Canal Association, party of the second part, both having sufficient powers, have entered into the following contract for the excavation of an interoceanic canal through the territory of Nicaragua:

ARTICLE I.

The Republic of Nicaragua grants the aforesaid Nicaragua Canal Association, and Mr. A. G. Menocal, representative of the said association, accepts on its behalf, for the purposes set forth in article 7, the exclusive privilege to excavate and operate a maritime canal across its territory, between the Atlantic and Pacific Oceans.

ARTICLE II.

The canal shall be of sufficient dimensions for the free and commodious passage of vessels of the same size as the large steamers used for ocean navigation in Europe and America, provided that no locks used in said work shall be less than five hundred and fifty (550) feet in length and thirty feet in depth.

ARTICLE III.

The State declares this work to be one of public utility.

ARTICLE IV.

The duration of the present privilege shall be for ninety-nine (99) years, to be counted from the day the canal shall be opened to universal traffic. During the aforesaid period the company shall have the right to construct and operate a railway along the whole extent of the canal, or those parts of the same that may be considered convenient for the better service and operation of the said work.

ARTICLE V.

The State binds itself not to make any subsequent concession for the opening of a canal between the two oceans during the term of the present concession, and also to abstain from granting a concession for a railroad, such as might compete with the canal for the transportation of merchandise, during the same period; but nothing in this article shall prevent the Government of Nicaragua from constructing or permitting the construction of such railways as it may deem advisable for commerce and internal traffic. Said Government also to have the right to construct or permit the construction of an interoceanic railway if in course of time it be demonstrated that the canal is not sufficient to satisfy the demands of the traffic of all nations.

The grantee company shall have the right to establish such telegraph lines as it may deem necessary for the construction, management, and operation of the canal. The Government shall have the right to occupy these lines for the public service without any remuneration to the company.

ARTICLE VI.

The Government of the Republic declares, during the term of this concession, the ports at each extremity of the canal, and the canal itself, from sea to sea to be neutral, and that consequently the transit through the canal in case of war between two powers or between one or more and Nicaragua shall not be interrupted for such cause; and that merchant vessels and individuals of all nations of the world may freely enter the ports and pass through the canal without molestation or detention.

In general, all vessels may pass through the canal freely, without distinction, exclusion, or preference of persons or nationality, provided they pay the dues and observe the regulations established by the grantee company for the use of the said canal and its dependencies. The transit of foreign troops and vessels of war will be subjected to the prescriptions relating to the same established by treaties between Nicaragua and other powers or by international law. But entrance to the canal will be rigorously prohibited to vessels of war of such powers as may be at war with Nicaragua or with any other of the Central American Republics.

Nicaragua will endeavor to obtain from the powers that are to guarantee the neutrality that in the treaties that shall be made for that purpose they shall agree also to guarantee a zone of land parallel to the canal and also a maritime zone in both oceans, the dimensions of which will be determined in such treaties.

ARTICLE VII.

This present agreement, with all its charges and advantages, shall be the object of a company of execution in agreement with Articles I, X, and those following thereafter.

Said company shall be the grantee, and whenever said name is used in this present contract, reference is made to it.

ARTICLE VIII.

The present concession is transferable only to such company of execution as shall be organized by the Nicaragua Canal Association, and in no case to Governments or to foreign public powers. Nor shall the company cede to any foreign Government any part of the lands granted to it by this contract; but it may make transfers to private parties under the same restriction.

The Republic of Nicaragua cannot transfer its rights or shares by selling them to any Government.

ARTICLE IX.

The people of all nations shall be invited to contribute the necessary capital to the enterprise, and it shall be sufficient for the fulfillment of this requirement to publish an advertisement for thirty (30) consecutive days in one of the principal daily papers of each of the cities New York, London, and Paris.

The capital stock of the final company shall be composed of shares, bonds, or obligations of any other kind, in such proportion as it may deem convenient. The issue and transfer of these obligations shall be exempt from stamp dues and from any other imposts or taxes established or that may be hereafter established in the Republic.

Of the capital with which the company shall organize, and which it proposes to distribute among the different countries interested in the enterprise, there shall be reserved at least five (5) per cent for the Central American Government and citizens that may desire to subscribe.

As soon as the company is ready to open subscription books it shall advise the Government of Nicaragua, which will invite the other Governments and through them private parties to subscribe. All such shares not taken within six months following the date on which the Government shall have been advised of that circumstance shall remain subject to the free disposition of the company.

Article X.

The company shall be organized in the manner and under the conditions generally adopted for such companies. Its principal office shall be in New York, or where it may be deemed most convenient, and it may have branch offices in the different countries of Europe and America, where it may consider it expedient.

Its name shall be the "Maritime Canal Company of Nicaragua," and its board of directors shall be composed of persons, one-half at least, of them shall be chosen from the promoters who may yet preserve their quality as such.

Article XI.

The Government of Nicaragua in its character of shareholder in the company of execution, as hereinafter provided, shall have the perpetual right of naming one director, who shall be an integral part of the board of directors of the company, with all the rights, privileges, and advantages conferred upon them by the statutes of the company and the laws of the country under which it shall organize.

The Government shall also have the right in its aforesaid capacity of shareholder to take part in such elections as the company may hold.

Article XII.

The company is bound to keep a representative in Nicaragua vested with all powers necessary for the proper conduct of the service and for the transaction of its business with the Government.

Article XIII.

The canal will follow the valley of the River San Juan to Lake Nicaragua, through which will be designated the most convenient route for communication with the Pacific Ocean. In any event the company shall have the most ample freedom to select the route which it considers most convenient between the two oceans for the excavation of the canal and its dependencies and its ports, particularly those serving for entrance and exit on both oceans. The company shall have the same liberty to adopt the route which may be deemed most advantageous and economical for the construction of the canal, after the final survey by a commission of competent engineers.

However, should the company, after the survey of the river San Juan, find it necessary to abandon, in any place, the bed of the river, and cut a lateral canal, the Government of Nicaragua reserves the right of requiring from the company the duty of establishing a communication between the part of the San Juan not used for canal purposes and the dividing level of the canal, by means of a lock, or a series of locks, suitable for the navigation of ships of six feet draft. As soon as the final plans are adopted and laid before the Government, it shall notify the company within one month after their receipt whether or not they meet with its approval, in order that the company may proceed in accordance therewith. It is understood that this duty does not in any manner compel the company to place or maintain in navigable condition for small craft the lower part of the river which these locks may be intended to place in communication with the canal.

Article XIV.

Within three years, to be counted from the commencement of the work upon the Interoceanic Canal, the company shall, at its own expense, construct a navigable canal between Lake Managua and the navigable part of the Tipitapa River, near Pasquier, of sufficient dimensions to admit of the free passage of vessels drawing six feet and of 150 feet in length. When completed this canal shall be taken possession by the Government of Nicaragua, and will be, after that date, the property of the Republic, which, by virtue of its ownership, shall be bound to bear all expenses required in the future for the service, maintenance, repair, and operation of the canal. But the company shall have the right to make use of it for all purposes useful for the maritime canal enterprise, and to pass through it freely with its vessels and those belonging to contractors employed in the service of the Interoceanic Canal during the

term of this concession without being subject to any charge whatever, or to pay tolls or contributions of any kind to the Government of Nicaragua or to any person or company that may, through any cause, be in charge of the administration and operation of the work and its dependencies.

The Government of Nicaragua will place at the disposal of the company, free of all expenses and charges, all the lands that may be required, as well as the materials found thereon, or on those belonging to the Government and that may be utilized by the company in the execution of this work.

ARTICLE XV.

All expenditures for surveys, construction, maintenance, and operation of the Interoceanic Maritime Canal shall be borne by the concessionary company, without any subvention in money nor guaranty of interest on the part of the Republic, nor other concessions than those specified in the present agreement.

ARTICLE XVI.

The Company shall construct, at its expense, and maintain, in good condition, two large ports, one in the Atlantic and one in the Pacific, to serve as termini of the canal, each of them to have a lighthouse of the first order. It shall also construct at the two points on the borders of the lake, where the canal disembogues, two ports of lesser size, with the respective lighthouses.

The company is also obliged to maintain and improve said ports by means of dredges, dikes, piers, embankments, or any other works it may deem advisable, having always in view the good service of the traffic through the canal.

It may, for this purpose, select on the coasts of the two oceans, within the territory of Nicaragua, the localities which the surveys made indicate as preferable.

ARTICLE XVII.

All the space necessary, whether on the main land, in the lake, and its islands, at the ports, roadsteads, or rivers of the two oceans, for the establishment of the canal, its paths, and embankments, for depositing the materials from the excavations, and cuttings for the necessary spaces to be occupied by water after raising the dams which are to be constructed in the bed of the river, for all necessary deviations of streams, as well as for reservoirs, dikes, spaces about the locks, stations, lights and beacons, storehouses, buildings and workshops, deposits for materials, and also all those spaces necessary for the routes, service railways, and canals of the same nature for the transportation of the materials to the line of the work and for feeders for the canal; in short, all lands and places necessary to the construction and operation of the canal, as laid down in the drawings and plans made by the engineers of the company, shall be placed at the disposal of the company by the State, under the conditions set forth in the following articles.

ARTICLE XVIII.

Said lands belonging to the State will be given to the company without any compensation whatever; and, with regard to those belonging to private parties, the State charges itself with their expropriation if the company so requests. The compensation which may be required in this case shall be paid by the company.

ARTICLE XIX.

In all relating to the appropriation that may be made in conformity with the preceding article, the company shall enjoy all the immunities and privileges which the laws of the country accords to the State; so that in no case shall the company be obliged to pay more than the State would under similar circumstances.

ARTICLE XX.

The Government obliges itself to place the company, within six months after its request, in possession of up to one thousand (1,000) manzanas of land between the lake and the Pacific, at such places as the company shall designate, but they are to serve exclusively for cutting the canal, its havens, ports, and other accessory works. The Government shall on its own account cause the necessary expropriation to be made, and the company shall pay to it for all indemnity the sum of fifty thousand dollars ($50,000.00) American gold. This payment to be made by the company in Managua within four months after the date of its request.

ARTICLE XXI.

The company shall have the right to take, free of charge, from the public lands, for the purpose of construction, operation, and maintenance of the canal, whatever materials may be found on them, especially timber for construction and for fuel, the lime, stone, clay for bricks, and earth for fillings as may be necessary. As regards materials found on private lands, the company shall pay for what it may need thereof, enjoying in this respect the same rights and privileges which the State enjoys according to law.

ARTICLE XXII.

Should the company require to occupy, temporarily and during the construction of the canal, lands in the territory of Nicaragua which are not included in those designated in articles 17, 18, and 21, it shall not be obliged to pay any indemnity for them if they are public lands; and the state shall not have the right to sell or dispose of them in any other manner after the company has determined to occupy them, unless under the reservation of this right, whose limit shall be the completion of the works on the interoceanic canal. Should the lands belong to private parties the company shall enjoy, in regard to their temporary occupation, all the rights and privileges which the law accords to the state, with the special privilege of occupying them immediately after the declaration of necessity and utility, and after paying the compensation, which shall not exceed that which the state should be compelled to pay in a similar case.

ARTICLE XXIII.

The Republic of Nicaragua, desiring to assist the company efficaciously in the construction of the interoceanic canal, a work in which it takes the deepest interest, cedes in fee simple to the said company the public lands hereinafter mentioned in alternate lots with other similar ones which it reserves to itself, and of the dimensions and in the places as specified hereinafter:

1st. On the left bank of the river San Juan, from the Atlantic to Castillo Viejo, lots of three miles frontage on the canal and six miles in depth from the banks of the river. Where the canal diverges more than six miles from the banks of the river the lots are to be measured on both sides of it, and shall be three miles wide and six miles deep. And where this distance is less than six miles the lots shall be three miles front and three miles deep, and they shall be measured from the bank of the canal to the river, taking what may be lacking from the opposite bank of the canal.

2d. Three miles distance from Castillo up stream, on the right bank and up to the lake, lots of two miles in depth and two of frontage on the canal. From the lake along its south shore to the river Sapoá and thence to the river Lajas, lots of one mile frontage and one mile depth. On the left bank of the river from a point in front of Castillo and up to the lake, lots of three miles of frontage on the canal and four miles in depth.

3d. On the north shore of the lake, as far as the River Tule, lots of two miles frontage on the lake and two miles deep.

4th. In the places which the company selects in accordance with the government of the existing public lands, forty (40) lots, each four miles frontage by five miles deep, reserving always the acquired rights.

It is understood that the government reserves around each of the forts Castillo and San Carlos the lands included in a circle of one and one-half ($1\frac{1}{2}$) miles radius, whose center shall be the respective fortresses.

As a general rule, at the extremities of the interoceanic canal and at its points of contact with the lake, the opposite lots will be allotted one to the government and one to the company, but if this be not possible the first will belong to the government.

From the Atlantic to the lake that part of the river bed occupied by the canal shall be considered as part of the latter for all purposes of this article.

The measurement and setting out of all lands ceded by this contract shall be made at the expense of the grantees under the supervision of the Government.

The state shall vest in the company the possession of said lands so soon as the said company shall begin operations on the canal. Operations shall be regarded as begun when the provisions set forth in article 47 shall have been complied with. The final title deeds shall not be granted except as the work of the canal progresses and in due proportion.

ARTICLE XXIV.

In the unforeseen case that a new survey should show the necessity of adopting another line for the construction of the canal, which varies wholly or in part from the line set forth in article 13, the company shall have the right to the lands and other elements necessary for the construction of the canal, according to articles 16, 17, 18, 19, 21, and 22.

The company shall, in that event, also have the right to the lands mentioned in the preceding article, in the same proportions, conditions, and dimensions therein established, with the single proviso that if it alter the line the localities whence these lands shall be taken shall be altered accordingly.

ARTICLE XXV.

The state reserves the right to occupy, in the several lots of land granted the company, such places as it may need for such roads and public buildings as it may deem convenient. In the same manner it may use timber and other building materials found on such lands whenever they may be necessary for any work upon which it may determine. However, these lands with all their products, vegetable and mineral, shall be subject to the laws of the country so soon as they become the property of individual citizens by transfer from the company, and then, should the State need them for the ends set forth in this article, or for any others, it shall make compensation to their owners according to law, without any right on the part of the expropriated owners to reclaim against the company.

Should the company have improved the lands so taken for purposes of use, ornament, or pleasure the state shall be bound to reimburse it for such damages as it may have suffered, according to the assessment of experts.

ARTICLE XXVI.

Mines of coal, stone, gold, silver, iron, or other metals situated in the lands granted to the company shall belong to it by right, without need of previons "denounciation," it having the right to work them when considered expedient, subject to the laws of the country.

ARTICLE XXVII.

The company shall also have the right to utilize for its account, for sale or exportation, the lumber in the forests situated in the lands ceded to it by the state from the time they enter into possession of them in accordance with this contract; that is, from the time of commencement of the works, always saving the acquired rights.

ARTICLE XXVIII.

From the day on which the present concession is ratified by Congress the public lands included in those necessary for the construction of the canal can not be sold, nor can any of those ceded to the company on the banks of the canal by article 23. Nor can they be leased to the prejudice of the company.

ARTICLE XXIX.

The company shall have the right, throughout the extent of the canal as well as at its mouths on both oceans, and in the lake and throughout the extent of the lands ceded by virtue of Articles 16, 17, 22, and 23, to enter upon the work of locating, leveling, excavating, dredging, and in general any other work of whatsoever nature that may be judged useful for the establishment and feeding of the canal, or for its operation, preservation, and maintenance. The company is specially authorized to execute along the canal line and on the banks of the River San Juan and its affluents, within the territory of Nicaragua, and also on the tributaries of Lake Nicaragua, the lakes or water courses which can be utilized in their flow to the Pacific, the system of dikes, rectifications, dredgings, embankments, dams, cuts, location of buoys, and in general all the works that in the opinions of the engineers of the company are deemed indispensable for the construction, feeding, navigation, and operation of the canal. The company may also do all works of like character deemed necessary at the entrances of the canal into Lake Nicaragua, as well as in the lake itself, in accordance with the route that may be determined upon in order to secure in it easy navigation, and as may be found necessary in the other lakes or lagoons that are to be traversed.

The embankments, fillings, and dikes formed in the mouths of the canal in the lake and in the ports on the oceans, by deposits of materials resulting from the excavations of the canal, shall belong in fee simple to the company; the Government having the right to use them if necessary, after compensation made. But it may never obstruct said ports nor widen the beaches in front of them, unless there is absolute necessity to do so, and in this case the embankments and fillings that it may be necessary to construct in front of the ports shall belong to the Republic.

In general the company shall have the right to use all the lakes and rivers of Nicaragua, the waters of which may be necessary, in the judgment of the engineers of the company, for the construction and supply of the canal and for maintaining its operations. It being understood that the damages caused to private parties by the deviation of the water courses shall be compensated for by the company according to a just assessment by experts in agreement with the laws of the Republic.

ARTICLE XXX.

The company shall not import merchandise into the territory of the Republic for the purpose of trafficking without paying the import duties established by law. But it may import free of custom duties, and of any tax whatsoever, the articles needed for the works of the enterprise, such as surveys, examination of localities, construction, use, operation, maintenance, repairs, and improvements of the canal; for the telegraphic service and for that of the railways; for running the workshops the company may keep in operation; and such articles may consist of tools, machinery, apparatus, coal, limestone of all classes, lime, iron, and other metals, raw or manufactured, mining powder, dynamite, or any other analogous substance. These articles may be transported between whatever points they may be required during the works of opening of the canal, and be discharged and stored free of all local taxes.

The company may import free of duties and taxes, during the work on the canal, provisions and medicines absolutely necessary for its own consumption. Goods, the commerce of which is not free, are excepted from the privileges contained in this article, which goods, excepting powder, dynamite, and other explosives, remain subject to the requisites and duties prescribed by the laws.

ARTICLE XXXI.

The vessels employed by the company as tugboats or for the service of the canal shall be free from all duties and also the materials for their repair and the fuel they use. The vessels and appurtenances from whatever place they may be coming for the use of the company shall also be exempt from all duties.

ARTICLE XXXII.

The Government will establish such regulations as it may judge necessary to prevent smuggling and to maintain public order in the region of the canal.

The company is bound to lend its assistance for the enforcement of such regulations. But in the free zone along the margin of the canal, as hereinafter provided, measures for the prevention of smuggling shall be limited to vigilance on the part of the employé or employés whom it may concern without any further measures being taken against passengers, vessels, or their cargoes, excepting when an attempt at smuggling is discovered; it being the intention of the State that there should be the most ample liberty of transit by the canal for persons and property, with the sole limitations established by this contract. Consequently the company shall have the right to discharge and reload ships in transit at such points as may be necessary in order to make repairs, lighten the vessel, shift cargo, or on account of any accident that renders it absolutely necessary, without being subject to search, exactions, or contributions of any kind, provided that in each case, and before beginning operations, the nearest customhouse authority shall be notified.

ARTICLE XXXIII.

The Government shall lend its protection, in conformity with the laws of the country, to the engineers, contractors, employées, and laborers engaged in the preliminary surveys or in the works of construction and operation of the canal.

ARTICLE XXXIV.

The company shall be exempt from all forced loans and military exactions in time of peace and of war. The foreign agents and employées shall likewise be exempt

from direct contributions, forced loans, and military exactions during the time they are in the service of the canal, but they shall pay the taxes established by the laws if they acquire real property.

ARTICLE XXXV.

The company may freely introduce immigrants into the lands ceded to it, and the employés and workmen needed in its works and workshops. Asiatics, however, are excepted. Both the immigrants and the employés and workmen will be subject to the laws of the Republic and the regulations of the company. The Government assures them aid and protection and the enjoyment of their rights and guarantees in conformity with the constitution and the national laws during the time they remain on Nicaraguan territory.

ARTICLE XXXVI.

The Government of Nicaragua assures to the company and its agents under the laws of the country, as it does to the other inhabitants, the full enjoyment of the guarantees and rights which the constitution and the same laws grant to them. And reciprocally the company and its agents bind themselves strictly to respect the laws and regulations that are in force in Nicaragua, and especially to comply with the executory judgments of the tribunals without considering themselves vested with other rights than those which the laws concede in favor of the Nicaraguans.

ARTICLE XXXVII.

The Government shall establish all along the line of the canal included between the two terminal ports such police stations and revenue offices as in its judgment are necessary to preserve order in the region of the canal and for the observance of the fiscal laws of the Republic. All expenses incident to this service, including those of buildings, endowments, salaries and allowances of employées, and transportation of the forces, shall be paid to the Government by the company on such terms and conditions as may be established, taking into consideration the requirements and necessities of such service. The company, however, shall have the power to establish guards and watchmen for the service of the canal and the enforcement of its regulations.

ARTICLE XXXVIII.

Contracts for labor on the canal shall enjoy the privileges which the laws of the country accord to agricultural contracts, provided they be clothed with the formalities that the laws require in such contracts. And the contracts in regard to canal labor that the company execute in foreign countries shall be valid and lawful in Nicaragua during the term stipulated in them, provided they do not violate the laws of the Republic; provided also the documents containing them be presented to the proper authorities, with due authentication, that they may be registered.

ARTICLE XXXIX.

The company shall be exempt during the period of this concession, in peace and in war, from all manner of taxes upon the real property it may acquire by virtue of this contract, and from every kind of direct contributions, local taxes, or any other tax relating to the property and use of the canal, its buildings, and constructions appertaining thereto, in its entire length, including those that are situated in the ports and maritime establishments on the two oceans, as also the lands conceded to the company for the whole term of the privilege. This franchise is not assignable to those who buy the real estate which the company may dispose of by virtue of this concession.

ARTICLE XL.

The Republic of Nicaragua shall not establish any tonnage, anchorage, pilot, lighthouse dues or charges of any kind whatsoever upon vessels of whatever class, or upon the merchandise, baggage, and passengers which may pass through the canal from one ocean to the other, all such dues being reserved for the benefit of the company, as hereinafter set forth in article 43.

But all such merchandise as shall be loaded or discharged at any point of the canal intended for sale shall pay the import and export duties fixed by the revenue laws of the state.

ARTICLE XLI.

With the view of securing the most ample freedom in the transit of persons and property, and in order to remove as far as possible occasions for disagreeable questions, there shall be on each side of the canal a free zone, the extent of which shall be one hundred yards measured from the water's edge in the canal, it being understood that the borders of the lake shall not be considered as margin of the canal for the purposes of this stipulation.

All traffic declared illegal by the laws of the Republic shall be prohibited within the said zone, and the revenue authorities charged with watching and preventing smuggling shall act in conformity with the stipulations in article 32.

It is expressly agreed that every vessel that passes through the canal shall carry on board an officer named by the Government when the authorities think it necessary, and this employé shall act in conformity with the law in case he discovers its infringement.

The two ports to be constructed for the entrance and exit of the canal on the two oceans shall be declared free ports, and they shall be recognized as such from the beginning of the work to the termination of this concession.

The Government in agreement with the company shall establish, by special degree, the limits of the freedom of these ports, which limits shall not extend beyond the waters of the port, which are those included between the mouth of the canal and the entrance to the said ports.

ARTICLE XLII.

For the proper administration of the canal and its appurtenances, and in order to facilitate its construction and operation, the company shall establish the necessary regulations, which shall be binding on all persons found in its waters or its appurtenances, the sole reservation being that the rights and sovereignty of the State be respected.

It being understood that the company in the exercise of the powers conferred by this article may not make other regulations than those necessary for the administration and particular management of the canal, and that before executing and enforcing these regulations they shall be submitted to the Government for approval. The state will lend the aid of its authority for the enforcement of these regulations.

ARTICLE XLIII.

By way of compensation for the expenses of surveys, construction, maintenance, and operation of the canal, which under the present concession shall be at the cost of the company during the period of said privilege, it shall have the right to establish and collect for the passage of all kinds of vessels, travelers, and merchandise through the canal, and in the waters and ports pertaining to it, taxes on navigation, tonnage, and pilotage, towage, storage, lay days, anchorage, light, roadstead dues, wharfage, hospital dues, and any other similar charges in conformity with the tariff to be established by it in accordance with Article LII of this contract.

These tariffs may be modified by the company at any time on condition that all modifications that may be introduced shall previously be communicated to the Government, which, in case of finding them within the limits established by the said Article LII, shall cause them to be complied with as if they were regulations enacted by itself.

The payment of all the tariff dues shall be exacted without any exception or preference, and under identical conditions, from all vessels, whatever be the place they come from or their nationality, with the exception stipulated in the following article.

ARTICLE XLIV.

As compensation for the privileges and concessions that Nicaragua grants by this contract, it is hereby stipulated that the Republic shall enjoy the special privilege that Nicaraguan vessels sailing under the Nicaraguan flag may navigate the canal at a reduction of fifty (50 per cent.) per centum from the general tariff while engaged in the coasting trade or in the reciprocal trade with the other Republics of Central America. It is declared that the vessels referred to in the preceding paragraph must be exclusively of the register of the Republic, and they must not be owned, either in whole or in part, by citizens of other countries.

A reduction of fifty (50 per cent.) per cent. from the general tariff is also granted to vessels that begin their voyage for a foreign country in any of the ports belonging to the Republic, with a cargo wholly composed of products of the country. All the

privileges to which this article refers shall be extended to the other Republics of Central America whenever Nicaragua shall find itself free from international obligations which may prevent it, or whenever one or more of the said Republics shall form a single nation with Nicaragua. The company can not collect any navigation dues whatever upon vessels and craft navigating the lake of Nicaragua and its prolongations without passing out of the locks. The Nicaraguan vessels of war, and in the case above provided those of the Republic of Central America, shall not pay any dues on passing through the canal.

ARTICLE XLV.

In case it may be possible to utilize the waters of the canal and its dependencies for the irrigation of plantations, gardens, and streets, or for the supply of towns that may be without it, or as motive power for private enterprises, the company shall have power to supply it, collecting dues in proportion to the amount furnished, according to the tariff that it may be establish in agreement with the Government.

ARTICLE XLVI.

In view of the existence of an exclusive privilege granted by the Republic in favor to Mr. F. Alf. Pellas, by a contract ratified on the 16th of March, 1877, for the navigation by steam on the lake and river for the purposes of the internal commerce of the Republic, the canal company shall have the right of expropriation against Mr. Pellas, as regards his rights and properties, on just assessments by experts, after making a corresponding compensation according to the laws of the Republic.

It is also stipulated that the company binds itself to pay to the Government of the Republic all it may from now on expend in any way for the improvement of the navigation of the river and the port of San Juan del Norte. This payment shall be made within six months of the date of the beginning of the works of the canal, and according to the original accounts of the corresponding office.

ARTICLE XLVII.

The company shall undertake at its expense the final surveys of the ground and the location of the line of the canal by a commission of competent engineers, two of whom shall be appointed by the Government of the Republic, which shall protect as far as it may the said commission.

There is granted to the concessionary company a term, not exceeding one year, in which to commence the final surveys for the canal, and one year and one-half additional for completing them; to organize the executing company, and commence the work of construction. Said terms shall begin to be counted from the date of the ratification of the present contract by the Nicaraguan Congress, published in the official paper, which shall be construed as notification. Furthermore, said terms are not to be extended, and it is understood that operations are not considered to have been begun if during the first year of the work two million dollars ($2,000,000) are not expended on it.

ARTICLE XLVIII.

A term of ten years is also granted to the company for the construction, completion, and opening of the canal for maritime navigation. However, should events of main force arise, duly justified and sufficient to impede the regular progress of the works during the period of the said ten years, an extension shall be granted equal in duration to the time that may have been lost by such delays.

If, at the expiration of the ten years aforesaid, the works should not be completed so as to have the maritime communication between the two oceans opened, in consideration of the great capital the company may have invested in the enterprise, and of the good will and ability it may have shown, and the difficulties encountered, the Republic binds itself to concede a new extension.

ARTICLE XLIX.

As a guaranty of the fulfillment of the obligations which the company incurs in accordance with Article 47, it shall deposit to the order of the Government of Nicaragua in a bank or in a mercantile house in the city of New York, which the Government may designate and within sixty (60) days from the date of the ratification

of this contract, the sum of one hundred thousand ($100,000) dollars, American gold, which the company shall forfeit to the Republic if it do not fulfill the said obligations; and which sum otherwise shall be considered an advance to the Government on account of the necessary expenses of payment of the police of the canal according to the stipulations set forth in Article 37. This deposit, as soon as made, shall be at the disposal of the Government.

ARTICLE L.

In consideration of the valuable privileges, franchises, and concessions granted to the company by this contract, the Republic shall receive in shares, bonds, certificates or other securities which the company may issue to raise the corporate capital, six per centum of the total amount of the issue.

Such shares, bonds, certificates or other securities shall be free of all payment on the part of the Republic, being considered as paid in full. The six per centum shall in no event be less than four million dollars ($4,000,000), that is to say, forty thousand shares or obligations of whatsoever kind of one hundred ($100) dollars each.

Of said shares, bonds, certificates, or securities of whatsoever class, two-thirds shall not be transferable; but all shall participate in the benefits, interests, partitions, dividends, sinking funds, rights, privileges, and in all the advantages given to paid up shares without any distinction. The Government in its capacity of shareholder shall besides have the right to appoint one director who shall represent its interest in the board of directors of the canal company from the time of its definite establishment. The shares referred to in this article shall be delivered to the agent the Government may appoint to receive them and as soon as the company shall be ready to issue the certificates for its capital.

ARTICLE LI.

In order that the canal association may indemnify itself for the expenses it may have had to incur for the verifications, preparations, explorations, and surveys hereinbefore mentioned, and for all other expenditures that it will have to make until the definite organization of the company, it shall have the right from the time of the organization of said company to six per cent. in shares, bonds, certificates, or other securities which the company may issue for the purpose of raising the corporate capital, and which are to be issued in excess of the capital to be subscribed.

These bonds, shares, or securities shall be identically like the subscription shares, and issued from the same register or stock book. As a consequence they shall participate in all benefits, interests, partitions, dividends, sinking fund, rights, privileges, and of all the advantages given to the paid up shares, bonds, or securities without any distinction whatever.

ARTICLE LII.

From the receipts of the enterprise the company shall take in the first place the necessary amount to cover all the expenses for maintenance, operation, and administration; all the sums necessary to secure the interest which shall not exceed six per centum, and the amortization of the obligations and of the shares, and what remains shall form the net profits, of which at least eighty per centum (80 per cent.) shall be divided among the shareholders, it being agreed that after the lapse of ten years after the completion of the canal the company shall not divide among the shareholders in payment of dividends, directly or indirectly, by issue of shares or otherwise, more than fifteen per centum (15 per cent.) annually or in this proportion, from dues collected from the aforesaid canal and where it shall appear that these dues yield a greater profit, they shall be reduced to the fixed limit of fifteen per cent. per annum.

ARTICLE LIII.

The present concession shall be forfeited:

1st. Through the failure on the part of the company to comply with any of the conditions contained in Articles 8, 46, 47, 48, and 49.

2d. If the service of the canal, after its completion, be interrupted for six months, except in cases of main force.

When the concession shall have been declared forfeited, from whichever of these causes the public lands granted by this convention will revert to the Republic, in whatsoever state they may be, and without compensation even in the case that buildings may have been erected thereon.

Such lands shall be excepted as may have been alienated to private parties by the company, with the formalities prescribed by law, provided that such alienations shall not have taken place within the six months preceding the date on which the company may have become legally liable to the penalty herein established.

ARTICLE LIV.

On the expiration of the ninety-nine years stipulated in this concession, or in the event of the forfeiture contained in the preceding article, the Republic shall enter upon possession in perpetuity, of the canal, of works of art, lighthouses, storehouses, stations, deposits, stores, and all the establishments used in the administration of the canal, without being obliged to pay any indemnity to the company.

There shall be excepted from this condition, the vessels belonging to the company, its stores of coal and other materials, its mechanical work shops, its floating capital and reserve fund, as also the lands ceded to it by the State, excepting those in which are established the works indicated in the first part of this article, and which will revert to the State together with their immediate appurtenances, as necessary for the service of the canal, and as an integral part of the same.

But the company shall have the right, at the expiration of the aforesaid term of ninety-nine years, to the full enjoyment of the free use and control of the canal in the capacity of lessee, with all the privileges and advantages granted by the said concession, and for another term of ninety-nine years, on the condition of paying twenty-five per cent of the annual net profits of the enterprise to the Government of the Republic, besides the dividends due to it for its shares in the capital stock.

The company furthermore shall have the right to fix, at its discretion, the dues referred to in article 43 of this concession, so that the shareholders still receive dividends not to exceed ten per centum per annum on the whole capital after deducting the payment of twenty-five per cent of the net gains to the Government.

At the expiration of this second term of ninety-nine years the Government shall enter into perpetual possession of the canal and other properties referred to in the first part of this article, including also in this possession all that which is excluded in the said first part with the exception of the reserve and amortization funds. The failure to comply with any of the terms of the lease shall terminate it, and the State shall enter into possession of the canal and other works belonging to it in accordance with the provisions of the preceding paragraph.

ARTICLE LV.

Any misunderstanding that may arise between the State of Nicaragua and the company in regard to the interpretation of the present stipulations shall be submitted to a court of arbitrators composed of four members, two of which shall be appointed by the State and two by the company.

These arbitrators shall be designated by each of the parties within the period of four months from the day on which one of the contracting parties shall have informed the other in writing of the want of agreement on the point at issue. Should one of the parties allow the aforesaid term to pass, it shall be considered as assenting to the opinion or claim of the other.

The majority of the votes of the arbitrators shall decide finally and without recourse. In case of a tie vote the arbitrators shall select, by mutual consent, a fifth person, who shall decide. If unable to agree to such nomination, they shall draw by lot the names of the diplomatic representatives accredited to Nicaragua, and the first one drawn out shall exercise the functions of the fifth arbitrator; he shall either adopt the opinion of one or the other of the parties to the controversy, or render his opinion between these extremes, and his decision shall be final and without any appeal whatever; the fifth arbitrator failing, the second person drawn shall exercise these functions, and so on successively until a decision is reached.

Prior to the initiation of the works of opening the canal the Government shall formulate, with the concurrence of the company, rules to be observed by the arbitrators in all matters relating to procedure.

Questions between the company and individuals residing in Nicaragua shall be under the jurisdiction of the ordinary tribunals of Nicaragua, in conformity with the legislation of the country. In matters pertaining to nonresidents of Nicaragua the rules of international private law will be observed.

In witness of the foregoing stipulations, we have signed two instruments of the same tenor in Managua, on the 23d day of March, one thousand eight hundred and eighty-seven.

AD. CARDENAS.
A. G. MENOCAL.

The Government, finding the foregoing contract in conformity with the instructions transmitted, determines to approve it in all its parts and to submit it to Congress for its ratification.

Managua, April twelfth, one thousand eight hundred and eighty-seven.

E. CARAZO.

The acting subsecretary of the interior.

CANTON.

Done in the hall of sessions of the chamber of deputies, Managua, April 20, 1887.

TOMÁS ARMIJO.
LEOPOLDO M. MONTENEGRO.

LUIS E. SAENZ.

To the S. E. P., hall of the senate, Managua, April 23, 1887.

JOAQUIN ZAVALA.

S. MORÁLES.

ELIODORO RIVAS.

Therefore be it executed. Managua, April 24, 1887.

E. CARAZO.

The subsecretary of the interior in charge of the office:

ALEJANDRO CANTON.

Accepted on the same date.

CANTON.
A. G. MENOCAL.

I do hereby certify the preceding signature of the subsecretary of the interior, which reads Alejandro Canton, to be genuine.
Managua, April 25, 1887.

JOAQUIN ELIZONDO.

APPENDIX K.

CONCESSIONS AND DECREES OF THE REPUBLIC OF COSTA RICA TO THE NICARAGUA CANAL ASSOCIATION OF NEW YORK.

The Constitutional Congress of the Republic of Costa Rica, in the exercise of the powers granted to it by section 4, article 73, of the constitution, decrees—

ARTICLE FIRST.—The contract entered into on the 21st of July last between the honorable minister of public works, authorized for this purpose by the honorable President of the Republic, on behalf of the Government of the same, and Mr. Aniceto G. Menocal, on behalf of the Nicaragua Canal Association, for excavating and operating an interoceanic canal crossing, either in whole or in part, through the territory of the Republic, or running along the whole or part of its boundary with Nicaragua, is hereby approved.

The aforesaid contract with the modifications agreed to by Congress reads literally as follows:

The undersigned, Pedro Pérez Zeledón, secretary of the state bureau of public works, especially authorized by the honorable general, President of the Republic, to celebrate ad referendum the present contract, party of the first part, and Aniceto G. Menocal, representing the Nicaragua Canal Association, with full powers from it, and also authorized for this purpose by the executive committee of the said association, party of the second part, have revised the contract for the canal made in Washington on the 17th of last May, by the party hereto of the first part, in his capacity as envoy extraordinary and minister plenipotentiary of the Republic of Costa Rica to the Government of the United States of America, and Mr. Hiram Hitchcock, president of the aforesaid association; the said contract, with the modifications now agreed to by the undersigned, reads as follows:

ARTICLE I.

The Republic of Costa Rica grants to the Nicaragua Canal Association, its successors and assigns, the exclusive privilege to excavate and operate a maritime canal between the Atlantic and the Pacific Oceans, running either wholly or in part through the territory of the said Republic or along the whole or a part of her border line with the Republic of Nicaragua.

To render this contract fully efficient between the contracting parties hereto, it will be sufficient if the association aforesaid should use or occupy for the works of the said canal, or for any of its ports in one or the other oceans, any Costa Rican waters or at least waters in which Costa Rica has joint ownership or has rights of use and navigation.

Whenever the word "association" is used in this present document reference is made to the "Nicaragua Canal Association," its successors and assigns.

ARTICLE II.

The canal must be of sufficient dimensions for the free and commodious passage of vessels of the same size as the large steamers used for ocean navigation between Europe and America.

ARTICLE III.

The State declares this work to be one of public utility.

ARTICLE IV.

The duration of the present privilege shall be for ninety-nine years, to be counted from the day on which the canal shall be opened to universal traffic.

During the aforesaid period the association shall have the right to construct and operate within the territory of Costa Rica a railroad along the whole extent of the said canal, or those parts of the same which it may consider convenient for the better service and operation of the said work.

The Republic binds itself not to make any subsequent concession for the opening of a canal between the two oceans as long as the present privilege lasts.

The Republic will also abstain during the same period from granting, within a zone of twenty-five miles along the canal, concessions for railroads from sea to sea that might compete with the canal in the traffic between foreign nations. This restriction shall not prevent the construction of new railroads that may be convenient for Costa Rica to build to the canal, or to any point on the northern frontier of the Republic, either connecting or not with any other railroads.

ARTICLE V.

The grantee association shall have the right to establish such telegraph lines as may be considered necessary for the construction, management, and operation of the canal.

The Government shall have the right to use the telegraph lines of the company from any station to any station that may be included within the line from sea to sea, without being obliged to pay the company for such service.

ARTICLE VI.

The Government of the Republic declares and accepts that the ports at each extremity of the canal and the canal itself from sea to sea during the time of this concession shall be neutral; and consequently in case of war between other nations, or between one or more nations and Costa Rica, the transit through the canal shall not be interrupted for such cause, and the merchant vessels and individuals of all nations of the world may freely enter the aforesaid ports, or pass through the canal without molestation or detention.

In general, all vessels shall freely pass through the canal without distinction, exclusion, or preference, whether of persons or nationalities, provided that they pay the dues and comply with the rules established by the association for the use of the said canal and its dependencies.

The transit of foreign troops and vessels of war shall be regulated by such provisions in regard thereto as are now or may be hereafter established in the treaties between Costa Rica and other powers, or by international law. But the entrance of the canal shall be strictly forbidden to vessels of war of any nation which may be at war with Costa Rica or with any other of the Republics of Central America.

Costa Rica shall endeavor to obtain from the powers that are to guarantee the neutrality that in the treaties to be made for that purpose they shall also bind themselves to guarantee the same conditions to a zone of land parallel to the canal and also to a maritime zone in both oceans, the dimensions of which shall be fixed by such treaties.

ARTICLE VII.

The present concession shall be transferable only to such company or companies as may be organized for the purpose of constructing or operating the canal, and in no case to foreign Governments or to foreign public powers.

Nor shall the association have the right to transfer to any foreign Government or public power any part of the lands granted to it by this contract. But it shall have the right to make such transfers to private parties under the same restrictions.

The Republic of Costa Rica shall not *transfer* its rights and privileges in respect to the canal to any foreign Government or public power.

The people of all nations shall be invited to contribute the necessary capital to the enterprise, and it shall be sufficient for the fulfillment of this requirement to publish an advertisement for twenty consecutive days in one of the principal daily papers of each of the cities New York, London, and Paris.

ARTICLE VIII.

The capital stock (*capital social*) of the final company which is to operate the cana shall consist of shares of the face value of one hundred dollars each, which shall be issued in such amounts as may be deemed necessary. The issue and transfer both of these shares and of all the bonds and obligations that the company may issue shall be exempt from stamp dues and from all other taxes or imposts now established or to be hereafter established in the Republic.

A five per centum, at least, of the capital stock with which the said company may be organized shall be reserved for such Central American Governments and citizens as may wish to subscribe.

As soon the said company is ready to open subscription books notice shall be given by it to the Governments of Costa Rica and Nicaragua, which shall invite the other Governments of Central America and through them private parties to subscribe.

The shares which, within six months, to be counted from the date of the notice given to the Government, of the opening of the subscription books, are not paid for shall remain at the free disposition of the company.

ARTICLE IX.

The company shall be organized in the manner and under the conditions generally adopted for such companies. Its principal office shall be either in the city of New York or in such place as may be deemed convenient.

Its first board of directors shall be composed of persons, one-half, at least, of whom shall be chosen from those members of the Nicaragua Canal Association who were promoters of the enterprise.

ARTICLE X.

The Government of Costa Rica, in its capacity of stockholder in the final company as hereinafter provided, shall have the perpetual right of appointing one director, who shall be an integral part of the board of directors of the said company, with all the rights, privileges and advantages conferred upon the other directors of said company, by the charter, by-laws, and statutes of the company and the laws of the country under which it shall organize.

The Government, in the said capacity of stockholder, shall also have the right to take part in the elections that the company may hold.

ARTICLE XI.

The said final company is bound to keep a representative in Costa Rica, vested with ample powers for everything that may be of interest to the company, either actively or passively.

ARTICLE XII.

The association shall have the most ample liberty to select and adopt the route which it may deem most convenient, advantageous and economical between the two oceans for the excavation, construction, and operation of the canal and its dependencies and ports, whether the same passes wholly or in part through the territory of Costa Rica or only along its border line.

Should the canal deviate from the river San Juan, in that section of the same in which Costa Rica has the right of navigation, the association binds itself to establish at such points as the engineers may deem proper, a communication between such parts of the San Juan River as may not be canalized and the dividing level of the canal, to the end of facilitating, without payment of any dues whatever, the navigation of Costa Rica vessels between the non-canalized part of the San Juan River and the canal, by means of a lock or series of locks suitable for the navigation of vessels of six feet draught.

It is understood that this obligation does not in any manner bind the association to place or to keep in navigable condition the lower part of the river which these locks may be intended to place in communication with the canal.

ARTICLE XIII.

All expenditures for surveys, construction, maintenance, and operation of the canal shall be borne by the association without any subvention in money or guaranty of interest on the part the Republic.

ARTICLE XIV.

The association shall construct, at its expense, and shall keep in good condition, two large ports, one on the Atlantic and one on the Pacific, at such points or localities as it may select within or without the territory of Costa Rica, to serve as termini of the canal; and each of them shall have a light-house of the first order.

ACTICLE XV.

All the area within the territory of Costa Rica, whether at the ports, roadsteads, or rivers of the two oceans, which may be necessary for the establishment of the canal, its paths, and embankments, or which may be occupied and covered by water after raising the dams which are to be constructed in the beds of the rivers, or for all necessary deviations to be made, as well as for reservoirs, dikes, spaces about the locks, stations, light-houses, and canals, store-houses, buildings, and workshops, deposits for materials, and also all those required for the routes, service railways, and canals of the same nature, for the transportation of materials to the line of the work, and for feeders of the canal; in short, all lands and places within the territory of Costa Rica necessary to the construction and operation of the canal, as may be laid down in the final drawings and plans made by the engineers of the association, shall be placed by the State at the disposal of the said association under the conditions set forth in the following articles.

ARTICLE XVI.

Such unappropriated lands as belong to the State shall be given to the association without any compensation whatever, and with regard to those lands belonging to private parties the state undertakes to condemn them should the association demand it.

The compensation which, in agreement with the laws of Costa Rica, may have to be paid in such cases, shall be paid by the association, and to it shall be added the amount of the expenses and costs of the respective actuations, in such a way that the national treasury shall suffer no loss.

ARTICLE XVII.

In all relating to the condemnation to be made under the provisions of the preceding articles the association shall enjoy all the immunities and privileges that the laws of the country grant to the state, so that the association may not be obliged to pay more than the state would under similar circumstances.

ARTICLE XVIII.

For the construction, maintenance, and operation of the canal the association shall have the right to take free of charge from the lands belonging to the State whatever material of a spontaneous production of the land that may be found on them, especially timber for construction and fuel, and limestone, clay for bricks, and earth for fillings that are to be made. As regards materials of the said class found on lands belonging to private parties, the association shall have the same rights and privileges granted by the laws to the State.

ARTICLE XIX.

If it should be necessary for the association to occupy temporarily and during the construction of the canal lands in the territory of Costa Rica which are not included in those designated in the Articles XV, XVI, and XVIII, it shall not be obliged to pay any compensation for them if they are unappropriated lands. And the state shall not have the right to sell or dispose of them in any other manner after the association has once determined to occupy them, unless under the reservation of this right, the limit of which shall be the execution of the works of the Inter-oceanic Canal. Should the said lands belong to private parties, then the association shall enjoy, so far as the temporary occupation thereof is concerned, all the rights and franchises which the laws grant to the State, with the special privilege of occupying them immediately after the declaration of utility and necessity and after payment of the proper compensation, which shall never exceed that which the state would be obliged to pay in a similar case.

ARTICLE XX.

The Republic of Costa Rica desiring to aid efficiently the association in this enterprise cedes in fee simple to the said association the public lands hereinafter mentioned, in alternate lots, with other similar ones which it reserves for itself, to wit:

1st. On the right or southern bank of the San Juan River, from a point three English miles below Castillo Viejo to the confluence of the San Carlos, should the canal follow the valley of the San Juan, lots fronting on the canal three English miles front by six deep.

2d. Between the San Carlos River and the Atlantic, should the canal pass wholly or in part through the territory of Costa Rica, or along the boundary of Costa Rica, lots of three English miles frontage on the canal and four deep.

3d. Should the route of the Selinas Bay be adopted, lots of two English miles frontage on the canal by two deep in the Costa Rican territory crossed by the canal or along which it may run, from the Pacific Ocean to a point two English miles distant from the mouth of the Sapoa River in the Lake of Nicaragua.

4th. Should the canal deviate from the San Juan River more than four miles towards the interior of Costa Rica, lots to be measured on both sides of the canal of two miles front and two deep. Should the deviation be less than four miles, then the lots of the northern bank of the canal shall have a front of two miles and extend in depth until they touch the San Juan River.

5th. From the Rio Frio to the Sapoa on the south coast of the Lake of Nicaragua, at two miles distant from the same and following the curve of its bank, lots of two English miles front by two deep.

6th. In the places where the company in accordance with the Government may select from the existing unappropriated public lands twenty-five lots, each two English miles in frontage by four deep. As a general rule, at the extremities of the Interoceanic Canal, should the same be within the territory of Costa Rica, the opposite lots will be allotted, one to the Government and one to the company; but, if this be not possible, the first will belong to the Government.

The state shall vest in the association the posession of said lands as soon as the location of the canal is finally determined and its construction begun by the association.

The rights required by private parties in the lands set forth in the preceding clauses are hereby reserved.

The measurement and setting out of all lands ceded by this contract shall be made at the expense of the grantee, with the intervention of the government.

The final title deeds shall be issued in due proportion as the work advances and not before.

Between the Atlantic and the point three miles below Castillo Viejo all parts of the San Juan and Colorado rivers occupied by the canal shall be considered, for the purposes of the present article, as a part of the said canal.

It is hereby understood that the whole of the lands transferred to the association by Costa Rica, in the different places and in the form as set forth in the foregoing article, shall not exceed in amount one-fourth of the total amount of lands granted to the company by the Government of Nicaragua, according to the contract made by it. Should they exceed such amount, the difference shall be deducted by reducing the number of lots mentioned in subdivision 5th of this article.

ARTICLE XXI.

The state reserves the right to occupy, in the several lots of land ceded to the Association, such space as may be needed for such roads and public buildings as it may deem convenient. In the same manner it shall have the right to use timber and other building materials which may be found on said land whenever they may be necessary for any work upon which it may determine. Should these lands become the property of private persons by virtue of a transfer made by the company, and the State should need them for the purpose set forth in this article, or for some other purposes, it shall pay their owners for them in conformity with the laws, and the expropriated parties shall have no right or claim against the association.

Should the association have made improvements on the lands referred to whether for the purposes of utility, ornament, or pleasure, the State shall be bound to compensate it for such damages as it may suffer according to appraisals of experts.

ARTICLE XXII.

Mines of coal, gold, silver, iron, or other metals, and stone quarries situated in the lands ceded to the association shall belong to it by right without the necessity of previous denunciation, and it shall have the right to work them whenever it may

deem it convenient, subject to the laws of the Republic, but such lands as may be transferred by the association to private parties shall not enjoy this privilege.

ARTICLE XXIII.

The association shall also have the right to utilize for the works of the canal and its appurtenances the timber in the forests situated in the lands granted to it by the state from the very moment from which it enters into possession of the same under the present contract, the acquired rights always being reserved.

ARTICLE XXIV.

From the day in which the present concession shall be ratified by Congress, no alienation shall be made of any unappropriated lands necessary for the construction of the canal nor of those ceded to the association on the banks of the same. Nor shall the said lands be leased to the prejudice of the company. However, should the location of the canal not be definitely settled when this contract is ratified, the line of the canal shall for the purposes of this article be presumed to follow the northern boundary line of Costa Rica.

ARTICLE XXV.

The association shall have the right of doing throughout the whole extent of the canal within the territory of Costa Rica, at the mouths of the canal on the two oceans, and in the whole extent of the lands which under the present contract have been granted to it according to articles 15, 16, and 20, all such works as may be necessary for locating, leveling, excavating and dredging the canal, and all other works that may be required for the establishment, feeding, operation, preservation, and maintenance of the canal.

The association is especially authorized to make along the line of the canal and on the Costa Rican bank of the San Juan River and its Costa Rican affluents and confluents, as well as on the Costa Rican rivers tributary to the Lake of Nicaragua, the lakes or water courses which may be utilized in their flow to the Pacific or to the Atlantic; to construct dikes and dams; make rectifications, dredgings, embankments, and deviations; to locate buoys, and in general to do all the works that in the opinion of the engineers of the association may be deemed indispensible for the construction, feeding, navigation, and operation of the canal. The embankments, fillings, and dikes which may be made within the territory of Costa Rica at the mouths of the canal on the ports on the two oceans, by using materials resulting from the excavation of the canal, shall belong in fee simple to the association; but the Government shall have the right to occupy them in whole or in part after compensation made. Should any port of the canal be within the territory of Costa Rica, the association shall not obstruct such port nor widen its beaches unless there is absolute necessity to do so, and in this case the embankments and fillings that it may be necessary to construct in front of said port shall belong to the Republic.

In general the association shall have the right to use all the lakes and rivers of Costa Rica the waters of which may be necessary in the judgment of the engineers of the association to construct and feed the canal and to maintain its operations, but this right shall have the following restrictions, to wit:

1st. The navigation of the Costa Rican rivers, which the association may dam or otherwise use for the benefit of the canal, shall remain at the termination of the respective works in as good condition as it was before they were made.

2d. In the places where the waters of said rivers may overflow in consequence of the erection of dams or other artificial obstructions made by the association, the said association shall be obliged to do whatever may be practicable to prevent the formation of swamps and marshes.

3d. Such damages as may be caused to private parties in consequence of the deviation or elevation of the streams shall be compensated for by the association according to appraisals made by experts in conformity with the laws of the Republic, but the association shall not be obliged to pay more than the state would under similar circumstances.

ARTICLE XXVI.

The association can not inport merchandise into the territory of the Republic for the purposes of trafficking with it without paying the custom duties established by law, but it shall have the right to import free from custom duties and of any other imposts whatsoever the articles needed for the works of the enterprise, its surveys, explora-

tions, examination of localities, constructions, use, operation, maintenance, repairs, and improvements of the canal, and also for the telegraphic and railroad service of the same, and for the works and workshops of the company, and the said articles may consist of implements, machinery, apparatus, coal, limestone of all classes, lime, iron, and other metals, whether raw or manufactured, mining powder, dynamite, or any other analogous substance. These articles may be transported between whatever points they may be needed during the work of the construction of the canal, and shall be landed and stored free from all local taxes.

The association shall also have the right to import free from duties or imposts, during the work of constructing the canal, such provisions, clothing for the workmen, and medicines as may be absolutely necessary for its own consumption.

Those articles the commerce of which is not free are excepted from the privileges granted in this article and shall remain subject, with the exception of gunpowder, dynamite, and other explosives, to such requisites and duties as are established by law.

Article XXVII.

The vessels that the association may employ as tug boats or for the service of the canal shall be free from all imposts or taxes of any kind whatever, and also the material to be used for their repair and the fuel that they may consume.

The vessels and their appurtenances, from whatever place they may come, for the service of the association shall be exempt from all duties and imposts.

Article XXIII.

The Government shall enact such regulations as it may deem necessary to prevent smuggling and for the preservation of public order in the region of the canal lying within the territory of Costa Rica or bordering on it and in the waters where it may exert joint jurisdiction. The company shall be bound to lend its assistance for the enforcement of such regulations. But in the free zone along the margin of the canal as hereinafter provided, measures for the prevention of smuggling shall be limited to vigilance on the part of the employé or employés whom it may concern, without right to any further measures, either against passengers, vessels, or their cargoes excepting when an attempt at smuggling may be discovered; it being the intention of the State that there shall be most ample freedom of transit through the canal for persons and property, with the sole limitations established by this contract. Consequently the association shall have the right to unload and reload ships in transit at such point as may be necessary in order to make repairs or lighten the vessels or shift their cargoes, or on account of any accident that unavoidably may render it necessary, without being subject thereby to search, exactions, or contributions of any kind, provided in each case, and before beginning operations, notice is given to the nearest custom house authority.

Article XXIX.

The Government shall afford its protection, in conformity with the laws of the Republic, to the engineers, contractors, employés, and laborers that may be engaged in the preliminary surveys or in the works of construction and operation of the canal.

Article XXX.

The association shall be exempt from all forced loans and military exactions whether in time of peace or of war. The foreign agents or employés shall also be exempt from direct taxes, forced loans, and military exactions during the time in which they are in the service of the canal, but they shall pay the direct taxes established by law in case they may become owners of real property or commercial or industrial establishments.

Article XXXI.

The association may freely introduce into the lands granted to it employés and laborers of every race who may be needed in its works and workshops; and it may also introduce immigrants of all nationalities, excepting Asiatics and negroes. Both the immigrants and the employés and laborers shall be subject to the laws of the Republic and to the regulations of the company. The Government assures them aid and protection and the enjoyment of their rights and guarantees in conformity with the constitution and the national laws during the time that they may remain within Costa Rican territory.

ARTICLE XXXII

The Government of Costa Rica shall assure the association and its agents, under the laws of the Republic, as it does to the other inhabitants, the full enjoyment of the guarantees and rights which the constitution and laws grant to them. Reciprocally the association and its agents bind themselves strictly to respect the laws and regulations in force in Costa Rica, and especially to comply with the final decisions of the courts, without considering themselves vested with other rights than those granted by law to Costa Rican citizens.

ARTICLE XXXIII.

The Government shall establish all along the line of the canal which may be within the territory of Costa Rica or along its frontier or in the waters appertaining to it in ownership or joint jurisdiction, such police stations and revenue offices as in its judgment may be necessary for the preservation of order in the region of the canal and for the observance of the fiscal laws of the Republic.

The expenses incident to said services, including those of buildings, salaries, wages, and allowances of the employés and transportation of the forces, and which may be in excess of such as are now borne by the Government for the custom house actually established at the mouth of the San Carlos, or on any other point that may be crossed by the canal, shall be paid to the public treasury by the company on such terms and conditions as may be established hereafter, taking into consideration the requirements and necessities of such services.

The association shall also have the right to establish guards and watchmen for the service of the canal and the enforcement of its regulations.

ARTICLE XXXIV.

All contracts in regard to the works of the canal that the association may enter into in foreign countries shall be valid and effective, and shall have full force and effect in Costa Rica, provided they do not violate the laws of the Republic.

ARTICLE XXXV.

The association shall be exempt during the period of this concession both in time of peace and in time of war from all kinds of taxes upon the real estate that it may acquire by virtue of this contract and from all kinds of direct taxes, local charges, or any other imposts relating to the property and use of the canal, or of its buildings and the construction and dependencies thereof, all along its extent, including those situated in the ports and maritime establishments on the two oceans.

This franchise is not transferable to the purchasers of the real estate which the association may alienate under this grant.

ARTICLE XXXVI.

The Republic of Costa Rica shall not establish any tonnage, anchorage, pilot, or lighthouse dues or any other charges of any kind whatsoever, upon vessels of any class whatever or upon the merchandise, baggage, and passengers which may pass through the canal from one ocean to the other; all such dues are reserved for the benefit of the association as provided for in article 39.

ARTICLE XXXVII.

For the purpose of securing the most ample liberty of transit of persons and property a free zone shall be established on each side of the canal, and the width thereof shall be 90 meters and 288 millimeters, measured from the water's edge in the canal.

All traffic declared illegal by the laws of the Republic shall, however, be prohibited within the said zone and the revenue authorities whose duty it is to watch for and prevent smuggling shall act in conformity with the stipulations of Article XXVIII.

It is expressly agreed that every vessel that may pass through the part of the canal which way be within the territory of Costa Rica or along its borders or in waters over which it exerts co-jurisdiction shall carry on board an officer appointed by the Government whenever the authorities may deem it convenient, and that officer shall act in conformity with the law should he discover that it is being violated.

The two ports to be constructed for the entrance and exit of the canal on both oceans, which may be wholly or in part within the territory or in waters of Costa Rica, shall be declared free ports and shall be recognized as such from the opening of the canal to the end of this concession.

The Government, in agreement with the company, shall establish, by means of a special decree, the limits of this franchise, which shall never extend beyond the waters of the ports comprised between the mouth of the canal and the entrance of said ports.

All merchandise that shall be loaded or discharged at any point of the canal within the territory of Costa Rica, and intended for internal commerce, shall pay the import and export duties fixed by the revenue laws of the State.

ARTICLE XXXVIII.

For the proper administration of the canal and its dependencies, and in order to facilitate its construction and operation, the association shall establish the proper regulations, which shall be binding upon every person who may be found in its waters or in its dependencies; the sole reservation being that the rights and sovereignty of the State be respected.

It is understood that the association, in the exercise of the powers conferred by this article, shall not make other regulations than those necessary for the administration and particular management of the canal; and that, before carrying them into effect, they shall be submitted for the approval of the Government. The State shall lend the aid of its authority to enforce these regulations.

ARTICLE XXXIX.

By way of compensation for the expenses incurred in the surveys, construction, maintenance, and operation of the canal, or any part thereof, during the period of said privilege, the said association shall have the right to establish and collect, for the passage of all kinds of ships, vessels, travelers, and merchandise through the canal and in the waters and ports pertaining to it, such dues of navigation, tonnage, pilotage, towage, storage, lay days, anchorage, light, roadsteads, wharfage, hospital dues, and any other similar charges, in conformity with the tariffs to be established by it in accordance with article 45 of this contract.

These tariffs may be modified by the association at any time, on condition that all modifications that may be introduced in it shall be previously communicated to the Government, which, in case of finding them within the limits established by said article 45, shall cause them to be complied with as if they were regulations enacted by itself.

The payment of all the tariff dues shall be exacted without any exception or preference, and under identical conditions, from all vessels, whatever be the place they come from or their nationality, with the exception stipulated in the following article.

ARTICLE XL.

In compensation for the privileges and concessions that Costa Rica grants by this contract, it is hereby stipulated that the Republic shall enjoy the special privilege that Costa Rican vessels, navigating under the flag of Costa Rica, shall be entitled to navigate the canal at a reduction of fifty per centum of the general tariff while engaged in the coasting trade, or in the reciprocal trade with the other Republics of Central America.

To enjoy this privilege, the said vessels shall be necessarily of the register of the Republic, and belong to citizens of the same.

A reduction of fifty per centum of the general tariff is also granted to all vessels that begin their voyage for a foreign country at any of the ports belonging to the Republic with a cargo wholly consisting of products of the country.

Costa Rican vessels of war and revenue cutters shall pay no dues in passing through the canal. No dues shall be paid by the vessels of the National Register navigating either Costa Rican waters connected with the canal or the canal itself, without passing out of the locks, but said vessels are not in any way to obstruct the free navigation of the canal.

Costa Rica, on its part, shall not object to the enjoyment by Nicaraguan ships of the advantage granted in this article to those of Costa Rica, provided that Nicaragua, on its part, consents that the ships of Costa Rica shall enjoy in Nicaraguan waters the said privilege.

All the concessions to which this article refers shall be extended to the other Republics of Central America, or any of them, whenever Costa Rica and Nicaragua shall find themselves free from international obligations which may prevent it, or whenever one or more of said Republics shall form a single nation with Costa Rica.

ARTICLE XLI.

In case it may be possible to utilize the waters of the canal and its dependencies for the irrigation of plantations, gardens, and streets, or for the supply of towns that may be without it, or as motive power for private enterprises, the company shall have the power to supply it, collecting dues in proportion to the amount furnished, according to the tariff that it may establish in agreement with the Government.

ARTICLE XLII.

The association shall undertake at its expense the final surveys of the ground and the location of the line of the canal by a commission of competent engineers. The Government of Costa Rica shall have the right of visiting and inspecting the final surveys which are in progress, and those already completed by an engineer appointed by said Government, and whose salary shall be paid by the association, the amount thereof to be fixed hereafter by special agreement between the Government and the company.

A period of two years and a half, to be counted from the date of the ratification of this contract, is granted the association for the final surveys of the canal, and within the said time the association shall have to make the said final surveys, organize the company which is to carry on the work, and begin the work of construction.

The work of construction shall be understood to have commenced if within three years after its inception two millions of dollars have been expended on it.

The period herein provided for shall admit of extension by the Republic at the request of the association and upon grounds of justice, in the judgment of the Government.

ARTICLE XLIII.

A term of ten years is also granted to the association for the construction completion, and opening to traffic the canal for maritime navigation. However, should events of main force arise, duly justified and sufficient to impede the regular progress of the works during the period of the said ten years, an extension shall be granted equal in duration to the time that may have been lost by such delays.

If at the expiration of the ten years aforesaid the works should not be completed so as to have the maritime communication between the two oceans opened, in consideration of the great capital the company may have invested in the enterprise and the good will and ability it may have shown and the difficulties encountered, the Republic binds itself to grant a new extension.

ARTICLE XLIV.

As a guaranty of the fulfillment of the obligations which the final company which is to construct the canal incurs in accordance with article 42, it shall deposit to the order of the Government of Costa Rica, in a bank or in a mercantile house in this city, or with an agent which the Government may designate, immediately after the certificates are issued, one thousand shares of its capital stock of the nominal value of $100 each. The said one thousand shares of capital stock shall be considered an advance to the Government of the payment of the police and revenue expenses to be made under article 33, and the association shall be credited with the actual value of said shares at the time such payments are made.

ARTICLE XLV.

In consideration of the valuable privileges, franchises, and concessions granted by virtue of this contract to the association, the Republic shall receive in shares, certificates, or other values representing the capital stock of the final company, an amount equal to one and one-half per centum of the total amount of the issue of said capital stock, in shares or certificates of $100 each. This sum shall in no event be less than $1,500,000. Said shares shall be considered as fully paid up, and two-thirds thereof shall not be transferable. All these shares shall participate in the benefits, interests, distributions, dividends, amortizations, rights, privileges, and all other advantages granted to paid-up shares, without any difference whatever. These shares, together with the other privileges herein granted by the association to the Government, shall be in full compensation to the Republic for all public unappropriated lands that may be flooded and for all the privileges and concessions conferred by this contract, and shall cover completely all claims of this description on the part of the state against the association or the final company. The shares to which this article refers shall be delivered to the agent appointed by the Government for this purpose as soon as the company may be ready to issue certificates of its capital.

ARTICLE XLVI.

From the earnings of the enterprise the company shall take, in the first place, the necessary amount to cover all the expenses for maintenance, operation, and administration; all the sums necessary to secure the interest, which shall not exceed six per centum, and the amortization of the obligations and of the shares, and what remains shall form the net profits, of which at least eighty per centum (80 per cent.) shall be divided among the shareholders, it being understood that after the lapse of ten years after the completion of the canal, the company shall in no case divide among its shareholders in payment of dividends, directly or indirectly, by issue of shares or otherwise, more than fifteen per centum (15 per cent.) annually or in this proportion, from dues collected from the aforesaid canal; and where it shall appear that these dues yield a greater profit, they shall be reduced to the fixed limit of fifteen per cent. per annum.

ARTICLE XLVII.

The present concession shall be forfeited:

1st. Through the failure on the part of the Company to comply with any one of the conditions contained in Articles VII, XLII, and XLIII.

2d. If the service of the canal, after it is completed, is interrupted for six months, unless in case of unforeseen accidents or main force.

When the concession shall have been declared forfeited from whichever of these causes, the public lands granted by virtue of the present contract shall revert to the Republic in whatever condition they may be, and without compensation, such lands as may have been alienated by the Company with the formalities prescribed by law, shall be excepted, provided that such alienations shall not have taken place within the six months preceding the date on which the company may have become legally liable to the penalty herein established.

ARTICLE XLVIII.

At the expiration of the ninety-nine years stipulated in this concession, or in the event of the forfeiture expressed in the preceding article, the Republic shall enter into the possession in perpetuity of that part of the canal, its warehouses, stations and other establishments used for the management thereof that may be found within the national territory. Such works as may be found in waters in which the Republic has joint sovereignty shall belong to her in joint ownership. And in regard to such parts of the canal or of the waters thereof in which Costa Rica has not the eminent domain, but simply the right of use and free navigation, the Republic, at the expiration of the ninety-nine years, or in the cases of forfeiture above named, shall retain in perpetuity the said rights of use and free navigation. The Republic shall not be obliged to pay to the company any compensation for the same.

There shall be excepted from this condition the vessels belonging to the company, its stores of coal and other materials, its mechanical workshops, its floating capital and reserve fund, and at the expiration of the said ninety-nine years also the lands ceded to it by the state under the present contract, excepting those in which the works indicated in the first part of this article may be found established, which will become the property of the state, with their immediate dependencies as necessary for the service of the canal and an integral part of the same.

But the company shall have the right, at the expiration of the aforesaid term of ninety-nine years, to the full enjoyment and a free use and control of the canal and such parts thereof as may be within the territory of Costa Rica, with all the privileges and advantages granted by this concession in the capacity of lessee for a second period of ninety-nine years, upon payment to the Government of Costa Rica of six and one quarter per centum of the annual net profits of the enterprise, besides the dividends due to it for its share in the capital stock.

The company shall have the right to fix at its discretion the dues referred to in article 39 of this concession, so that the shareholders, after the payment of 31¼ per cent is deducted, shall still receive dividends of ten per cent per annum on the whole capital.

At the expiration of this second period of ninety-nine years the Government shall enter into perpetual possession of the canal and the other property referred to in the first part of this article; and this delivery shall also embrace everything excluded in the said first part, except the lands ceded to the association by this contract and the reserve and sinking fund.

The failure to comply with any of the conditions of the lease shall terminate it, and the state shall enter into the possession of the part of the canal which corresponds to it, owing to it being situated in Costa Rican territory or in the places in which Costa Rica is joint owner, and also of the other works which belong to the canal, in accordance with the provisions of the preceding paragraph.

ARTICLE XLIX.

Any misunderstanding that may arise between the Republic and the company in regard to the interpretation of the present stipulations shall be submitted to a court of arbitrators, composed of four members, two of whom shall be appointed by the state and two by the company.

These arbitrators shall be designated by each party within the period of four months from the day on which one of them shall give notice to the other in writing of the want of agreement on the point at issue. Should one of the parties allow this period to lapse it shall be considered as assenting to the opinion or claim of the other.

The majority of the votes of the arbitrators shall finally decide without recourse. In case of a tie vote the arbitrators shall appoint, by mutual consent, a fifth person, who shall decide, and in case of their default the respective parties will appoint him. If they cannot agree to such appointment they shall draw by lot the names of the diplomatic representatives accredited to Costa Rica, and the first one drawn out shall exercise the functions of the fifth arbitrator. He shall concur on one of the two opinions, and what may be so decided shall be final and without recourse of any kind. If the fifth arbitrator should fail, the second person drawn shall exercise these functions, and so on successively until the decision is reached.

Prior to the initiation of the works of opening the canal the Government, in concurrence with the company, shall formulate a set of rules to be observed by the arbitrators in all matters relating to procedure.

All questions between the association and private parties residing in Costa Rica shall be determined by the ordinary courts of Costa Rica in conformity with the legislation of the Republic. In matters pertaining to parties not residing in Costa Rica the rules of private international law shall be observed.

ARTICLE L.

This contract, after being approved by the Hon. General President of the Republic, shall be submitted to the supreme legislative power for the purpose that if they deem it convenient they should impart to it the necessary ratification, and in case such approval is not obtained, the Nicaragua Canal Association will be released from all the obligations to which it is bound by it. Such ratification or non-ratification shall be made within one hundred and twenty days from this date.

In witness whereof the undersigned have set their hands to four copies of the present contract, two for each party, in San José de Costa Rica, 31st July, 1888.

PEDRO PEREZ ZELEDÓN.
A. G. MENOCAL.

PALACE OF THE PRESIDENT,
San José, July 31, 1888.

In consideration that the foregoing contract agrees with the instructions given for its celebration to the honorable secretary of state, who authorizes it, it is hereby approved in all its parts for the purpose that it may be submitted to the deliberation of the Constitutional Congress.

Countersigned by his honor the President of the Republic.

PEREZ ZELEDÓN.

ARTICLE 2.—The contract to which the foregoing article refers is hereby exempted from the payment of stamp duties.

To the executive power:

Given in the hall of sessions of the national palace in San José, on the 9th day of August, 1888.

A. ESQUIVEL,
President.

MANUEL J. JIMÉNEZ,
Secretary.
FÉLIX GONZÁLEZ,
Vice Secretary.

PRESIDENTIAL PALACE,
San José August 9, 1888.

Therefore be it executed.

BERNARDO SOTO.

The secretary of state of the department of public works:

MAXIMO FERNANDEZ.

APPENDIX L.

REPORT ON THE TONNAGE OF TRAFFIC WITHIN THE ZONE OF ATTRACTION OF THE MARITIME CANAL OF NICARAGUA, IN 1890, *AND AS ESTIMATED FOR* 1897.

[By THOS. B. ATKINS, Secretary and Treasurer of the Maritime Canal Company of Nicaragua.]

THE MARITIME CANAL OF NICARAGUA.

REPORT ON THE TONNAGE OF TRAFFIC.

The question of the amount of traffic which will be attracted to any interoceanic canal across the American Isthmus is one concerning which there has been, and probably will continue to be, a wide difference of opinion.

The problem is unquestionably an intricate one. It is difficult to determine the relative value of the factors of which it is composed; and it is made more complex by the elements of futurity which enters into it.

The most serious attempt at its solution was made for the information of the International Congress, which assembled at Paris in 1879 to consider the various projects at that time before the public for an interoceanic canal across the Isthmus and the questions pertinent thereto. The question was then made the subject of careful investigation and study by a statistical commission composed of eminent scientists, statisticians and officials, of which M. Levasseur, member of the "Institute National" of France, was chairman.

"Lev." In the report at the time presented by M. Levasseur it was estimated upon premises set forth at some length, and which further on shall have more particular consideration, that the tonnage of traffic existing in 1876, within the zone of attraction of such a canal, upon the basis of an estimated average value per ton, was 5,268,000 tons.

Upon a statistical basis, partly furnished by Rear-Admiral Ammen, U. S. Navy, and Mr. Eli Lazard, of San Francisco, it was also estimated at 4,833,000 tons.

Both estimates being duly considered, 5,250,000 tons was finally accepted by the commission as a "very moderate" estimate of the tonnage existing in 1878 within the zone of attraction.

"Lev." In arriving at this conclusion the commission justly remarked: "Whatever may be the latitude at which the American Isthmus may be pierced between Lake Nicaragua and the Atrato, under whatever technical conditions the anal may be constructed, the commerce of the two oceans, considered as a whole will profit equally by it."

From these results thus arrived at it was argued in the report that the natural growth of commerce would, in ten years' time, say by 1888, increase the total of tributary tonnage from the 5,250,000 tons, recognized as existing in 1878, to 7,250,000 tons, from which the canal, at the time of its expected completion, would be able to draw for its revenue.

At the time when the report was prepared and submitted the statistics of international commerce were neither as abundant nor as accessible as they are at the present time; even now they are not by any means as complete as is desirable for an exact examination of the question. South American returns of tonnage are particularly misleading; oftentimes the same vessel is registered in more than one port of the same country, and thus is made to count twice or more times in the tonnage reports of registered entries and clearances. The only traffic data of those countries of reliability, are the values of exports and imports, which, from the channel through which they are collected—customs returns—are not apt, at all events, to be exaggerated.

In making a new estimate it is, therefore, not only expedient but almost imperative to follow the method adopted by M. Levasseur and his eminent associates in their work, and in doing so it is somewhat remarkable how fully the growth of commerce has verified their anticipations. This estimate of a time so long passed is chiefly valuable for comparison as indicating what growth of commerce may be anticipated in the lapse of time required for construction of the Nicaragua Canal, and it is of some importance in that respect to ascertain as nearly as possible the correctness of the premises with which comparison is to be made.

Accepting the report of the commission as a fair estimate of tributary commerce existing in 1878, we have 5,250,000 tons as a basis for comparison.

In an estimate furnished the United States Treasury Department in 1880 it is claimed that the meridian of 110° east from Greenwich will be the dividing line beyond which the attraction of the canal will cease to be influential. We are not pre-

pared to admit this, for the reason that ocean currents and prevailing winds and more favorable climate will at least influence much of the trade of Europe to circumnavigate the globe by way of the Nicaragua Canal, when it is opened, as a return route rather than to use the Suez Canal both going and returning; and thus the attraction of the canal will be felt to a greater or less extent even by the enormous trade of Europe, or, more exactly speaking, of England with India. This principle seems to have been accepted by the statistical commission. Adopting for the purpose of an estimate the dividing line suggested, the meridian of 110° east from Greenwich, the commerce of the world which would have been directly subject to the attraction of the canal in 1888, had it then existed, is largely shown in the following table, carefully compiled from official returns.

It is proper to premise (1) That, as previously stated, the most reliable statistics of commerce are given in values and not in bulk or weight; where it is otherwise, the fact is noted. (2) That wherever local statistics are accessible they are accepted as the more reliable; in other cases the figures of the British Board of Trade are accepted. (3) That as returns are made in different currencies they are roundly converted into dollars at $5 for the pound sterling, 20 cents for francs, 40 cents for guilders, 75 cents for pesos, $1.15 for Haikwan taels, 25 cents for marks, $1 for the yen of account, 20 cents for pesetas. These figures do not vary materially from actual values, and are very much more convenient for computation. (4) In the instance where returns are made in bulk they are reduced to tons at the round allowance of 1,000 grams to the ton.

Table of Commerce Subject to the Attraction of the Canal.

(To be divided into three classes: Class 1, entirely tributary; class 2, largely tributary; class 3, partially tributary.]

Commerce of the places named, exports and imports.

Reference.	Class.	Countries.	Amount.
		With Great Britain:	
S. Y. B., 111	2	Hong-Kong, 114° east from Greenwich	$20, 508, 000
S. Y. B., 235	2	New South Wales	83, 932, 800
S. Y. B., 261	2	Queensland	23, 655, 480
S. Y. B., 268	2	South Australia	24, 998, 480
S. Y. B., 286	2	Victoria	73, 606, 350
S. Y. B., 292	2	Western Australia	3, 380, 850
S. Y. B., 290	2	New Zealand	44, 564, 000
S. Y. B., 275	2	Tasmania	3, 608, 010
S. Y. B., 776	3	Java	22, 358, 760
S. Y. B., 944	2	Philippine Islands	14, 394, 690
S. Y. B., 416	2	China	54, 157, 657
S. Y. B., 715	2	Japan	37, 403, 580
S. Y. B., 452	1	Ecuador	2, 489, 910
S. Y. B., 809	1	Peru	15, 245, 870
S. Y. B., 387	1	Bolivia	1, 267, 830
S. Y. B., 406	2	Chili	62, 437, 161
S. Y. B., 78	2	Central America	10, 412, 250
		With France:	
S. Y. B., 515	2	New Caledonia	1, 565, 812
S. Y. B., 715	2	Japan	17, 761, 441
S. Y. B., 406	2	Chili	7, 857, 430
		With Germany:	
S. Y. B., 546	2	Australia	8, 129, 000
S. Y. B., 715	2	Japan	6, 878, 462
S. Y. B., 406	2	Chili	14, 098, 930
S. Y. B., 577	2	Hamburg with Australia	(*)
S. Y. B., 416	3	China with Germany, France, etc	18, 283, 315
S. Y. B., 944	3	Spain with Philippine Islands	4, 123, 000
S. Y. B., 379	1	Belgium with Peru	6, 440, 995
S. Y. B., 762	3	Netherlands with Dutch East Indies	66, 080, 000
		With United States (Atlantic ports, chiefly New York; Pacific ports, chiefly San Francisco):	
C. & N., 40	2	British East Indies, Atlantic ports	22, 765, 825
C. & N., 49	3	British East Indies, Pacific ports	1, 432, 041
C. & N., 39	2	French East Indies, Atlantic ports	319, 427
C. & N., 40	2	Dutch East Indies, Atlantic ports	7, 042, 412
C. & N., 40	1	Hong-Kong, Atlantic ports	2, 113, 021
C. & N., 41	3	Hong-Kong, Pacific ports	3, 050, 556
C. & N., 39	1	China, Atlantic ports	12, 484, 834
C. & N., 39	3	China, Pacific ports	6, 932, 940
C. & N., 42	1	Japan, Atlantic ports	10, 038, 673
C. & N., 43	3	Japan, Pacific ports	9, 380, 330
C. & N., 40	1	British Australia, Atlantic ports	13, 279, 825
C. & N., 41	3	British Australia, Pacific ports	5, 040, 316
C. & N., 42	1	Philippine Islands, Atlantic ports	8, 719, 000

Commerce of places named, exports and imports—Continued.

Reference.	Class.	Countries.	Amount.
		With United States (Atlantic ports, chiefly New York; Pacific ports, chiefly San Francisco)—Continued.	
C. & N., 43	3	Philippine Islands, Pacific ports	$2,053,660
C. & N., 42	1	Hawaii, Atlantic ports	197,619
C. & N., 43	3	Hawaii, Pacific ports	16,025,780
C. & N., 32	1	Chili	4,814,625
C. & N., 34	1	Ecuador	1,331,370
C. & N., 36	1	Peru	1,024,497
C. & N., 22 and 24	2	Central America (Nicaragua, Costa Rica, and Salvador)	5,170,980
		Pacific ports of the United States with—	
C. & N., 5	1	Belgium	837,840
C. & N., 7	1	France	5,632,359
C. & N., 7	1	Germany	1,136,506
C. & N., 6–10	1	Great Britain	33,944,476
C. & N., 30	1	Cuba	535,111
C. & N., 33	1	Brazil	166,012
		Total	825,110,167

* Value, not reported; weight, 65,300,000 kilos, say about 65,300 tons.

In the table the trade of Asia, etc., with interior ports of entry of the United States, which is chiefly transshipped at San Francisco, is omitted because it is almost entirely in high-priced commodities which yields only a low tonnage. It amounts to $2,305,138.

C. & N., 45.

To this large aggregate there should be added the commerce of the Atlantic and Pacific coasts of the American continent, each with the other, and any other trade of the Pacific coast not already included. Some portion of the trade referred to now finds its way around Cape Horn, a part goes by the way of the Panama Railroad across the Isthmus, and a considerable portion of it helps to make up the tonnage of the Pacific railroads. A large part of the Pacific railroad portion is included in the items of commerce between China, Japan and Australia, and the United States, particularly that part of such commerce as is entered via San Francisco.

In addition to this there is a large traffic between our Atlantic and Pacific seaboard already established and likely to increase with such strides as is known to trade and commerce in the Western hemisphere only as soon as an advantageous waterway is offered for its transportation. It is now limited by the high cost of railroad transportation or the length of the ocean voyage. The rate for transportation between New York and San Francisco by rail in carload lots is not less than $20 per ton on low class freight and much higher on general merchandise. By sailing vessels freights are rarely over $10, and more often $8 or $9. The difference in time of transit by existing routes is that between one hundred and twenty days for a voyage aronnd Cape Horn and fifteen to eighteen days for fast freight by rail across the continent.

From Hong-Kong to New York, around the Cape, is about one hundred and sixty-five to one hundred and seventy days by sailing vessel; by steamer across the Pacific and rail across the continent it is thirty-eight to forty days; by the canal route it would be one hundred days by sail and thirty-eight to forty days by steamer. Under certain conditions commerce pays the difference in cost to save the difference in time between the quicker and the slower route, for by so doing capital is turned over and made to yield its profit more frequently, the risks of unforeseen contingencies are reduced to a minimum, and the accidents which bring disaster to the merchant are, to an equal extent, avoided. High-priced commodities, such as come to us from Asia and the islands of the Pacific, will bear the additional charge in consideration of the saving of time, but lumber and other low-priced material can not. Recently the bark *W. W. Crapo* brought from Port Townsend, Wash., a cargo of shingles and spars to Boston, Mass. The *Crapo* is a 1,650-ton bark, and could be run at a cost of, say, $75* per day, not including port charges. She occupied one hundred and twenty-eight days in her voyage and sailed 16,200 miles. By the Nicaragua route the distance from Port Townsend to Boston is about 5,600 miles and the saving about 10,600 miles, nearly 76 per cent., or, say, more than eighty-three days of her passage, which would amount to a saving in actual expense of $6,225, without regard to the advantage to both shipowner and lumber merchant in their economies of time, insurance, and use of capital, which upon her cargo could not have been less than $40 per day, or an aggregate of $3,300 more.

*75 per day for costs includes interest upon cost of vessel, insurance, depreciation of value, repairs, wages, and provisioning.

Under such advantages as the canal would offer an enormous coastwise commerce in coal, provisions, lumber, and the various commodities of commerce, the traffic in which is largely dependent upon advantageous transportation, would of necessity be developed, the magnitude of which it is impossible to estimate. The same reasons will operate to divert to the canal a very considerable portion of the trans-continental traffic from China, Japan, Australia, and the Sandwich islands, which has been diverted originally from the Cape Horn route, and now constitutes a large part of the tonnage of the Panama or Pacific railroads. It is in this view of the matter that we have included in the table of commerce the traffic between these countries and the port of San Francisco as tributary in a degree to the canal.

There should also be added to the table a proper estimate of the proportion of the commerce between Great Britain and her East Indian colonies which will seek the Nicaragua Canal as a return route in perference to the Suez Canal, because of favoring winds and currents, more favorable temperature, and other reasons which the merchant will be quick to discover.

The first item mentioned, existing traffic between the Atlantic and Pacific coasts of the continent not otherwise included, has been estimated at figures varying from 265,531 tons in 1887 to 275,000 tons in 1888, distributed as follows:

	Tons.
Between Atlantic and Pacific ports of United States, around Cape Horn...	145,713
British Columbia with Europe, around Cape Horn	69,818
To which add similar tonnage by the Isthmus of Panama, estimated at....	50,000
Estimate of 1887	265,531
For 1888 the following estimate has been made:	
By Panama	75,000
Between Atlantic and Pacific ports of United States, around Cape Horn...	185,000
British Columbia with Canada, around Cape Horn.....	15,000
	275,000

In this last estimate the trade of British Columbia with Europe is entirely omitted as apparently of no value; we may, however, assume that it was not less in 1888 and 1889 than in 1887, say 70,000 tons, and we may safely accept less than the mean of the two years, this included, as a just estimate of the annual amount, say, in round numbers, 275,000 tons.

As we have already included in the table of tributary traffic the commerce of Asia and the Pacific Islands with San Francisco, we make no separate estimate of the proportion of it which ought to be attracted to the canal, but in the distribution of the total consider it as among the probably tributary business. It is admitted without question that a considerable portion of this trade is directly with the inhabitants of the Pacific coast and for local consumption, but a certain proportion of it is transshipped by rail across the continent for consumption or distribution at points not ports of entry and where it can not be shipped "in bond." This portion of the trade would, because of the comparative cheapness of water transportation, be attracted by the canal, for the difference in time of transit by the canal and that of entry at the Pacific port, reshipment, and of freight transportation by rail across the continent would not be sufficient to warrant the additional cost of overland transportation; indeed, it would probably consume quite as much if not more time than the route by the canal. The time from Hong-Kong to New Orleans by steamer through the canal would be less than via San Francisco by steamer and rail from thence to New Orleans.

The value of the return commerce between Great Britain and her East Indian colonies remains to be considered. It is possible that the export trade from Great Britain to the East Indies will always seek the route by the Suez Canal, but there are reasons in the favoring winds and currents and more temperate climate to traverse, which make it exceedingly probable that the return voyage may be made more speedily and therefore less expensively, and at the same time more comfortably, by the Nicaragua Canal than by the route used for out-bound trade. It is not impossible, however, that the northeast trades which carried Columbus so successfully to Porto Rico may sufficiently favor the out-bound voyage to attract even some portion of that trade, but there is no room to doubt that the canal will exert an attraction on that which is homeward bound. Moreover, not an inconsiderable part of the material of this traffic, such as plumbago from Ceylon and straw braid from China is immediately transshipped from London to New York for consumption in this country. What part of the export trade will seek the Nicaragua route may be disputed, but of that which now moves to Great Britain from that portion of the world the canal may with reason expect a fair share. The total of these imports into Great Britain from her East Indian possessions amounts to nearly $200,000,000 per annum.

To recapitulate. The amount of traffic, thus indicated, which would be attracted to a greater or less degree, by the Nicaragua Canal to-day, if it were open to business, is briefly:

The aggregage of the table	$825,110,167
The return trade from India and the Straits Settlements to Great Britain	195,683,679
Total value	1,020,793,846
Add to this value the trade of Hamburg with Australia, reported in quantity ..... tons..	65,300
The Atlantic and Pacific coastwise trade of the United States and British Columbia and other trade (not included in table) ..... tons..	275,000
Amount in bulk, not valued ..... do...	340,300

It remains to reduce the statistics of value to a tonnage basis and to distribute the whole in such a manner as shall clearly show the relative importance of the canal to the parts thus distributed.

"Lev." In the estimate of the Statistical Commission of 1879 it was calculated that 1,000,000 tons of the aggregate of commerce to be regarded as tributary to the canal consisted of flour, guano, and other low-priced commodities, which should be valued at 200 francs, or, say, $40 per ton. The remainder was valued at 375 francs, or $75 per ton, and the result was the estimate, after liberal allowance made, of 5,250,000 tons already cited.

When the low values of the commodities which constitute the great bulk of material transported are considered, it may well be questioned whether this valuation was not too high, and the allowance for low-priced commodities too small. As corroborating this opinion the following approximate values are submitted:

	Per ton
Coal is worth, say	$3.00
Crude oil is worth, say	16.00
Refined oil is worth, say	25.00
Sugar is worth, say	44.00
Flour is worth, say	50.00
Wheat is worth, say	35.00
Corn is worth, say	15.00
Guano is worth, say	30.00
Nitrates are worth, say	3.20

Reference.		Tons.
S.F.J.C.,	90	The wheat and flour fleet from San Francisco carried in 1889, 692,500 tons (over 90 per cent. wheat), mostly to Europe. 692,500
S. Y. B.,	405	Chili exported in 1888 of nitrates (680,000 of which which went to Europe, 80,000 to the United States). 760,000
S. Y. B.,	405	Of guano (estimated from report of value) 40,000
S. Y. B.,	405	Of wheat (estimated from report of value) 150,000
		Peru exported in the same year:
S. Y. B.,	809	Of guano 14,000
S. Y. B.,	809	Of nitrates 1,773,135
		And Bolivia exported:
S. Y. B.,	387	Of nitrates, by way of Arica; Peru (estimated from report of value) . 124,000
		Making a total of 3,553,635

The statistics of Chili, Peru, and Bolivia for 1889 are not yet accessible, but the business was larger than for 1888.

Of this total over 2,650,000 tons was of nitrates, 1,897,000 tons of which was cubic nitre, worth only about $3 per ton at place of shipment and valuation. Coal and coal oils, crude and refined, enter largely into outbound freights, and, being also articles of low valuation, must materially affect the general average of values. That this tonnage, as well as its return freight, or rather the outbound freight of which it is the return, would be almost entirely tributary to the canal, is evident from the fact that the canal will cut out from the voyage, as between San Francisco, Callao, Valparaiso, and Liverpool, in the first case, 6,996 miles; in the second, 4,690 miles, and in the third case, 2,144 miles, including the stormy, dangerous, and destructive* passage around Cape Horn. The difference from Valparaiso, the principal port of Chili, may not be sufficient to counterbalance the charges of the canal, but from Callao and ports north of it there can be no question as to the advantage to be gained by its use.

Appendix A.

* Destructive in its wear and tear upon vessel and rigging.

Following the method of the statistical commission, which, so far, is the best that has been suggested, and modifying it only to pay regard to ascertained facts, we may deduct from the aggregate of the table the following items as not open to estimate, their value and quantity both being already determined:

Reference.		Tons.	Value.
	Wheat and flour from South American ports (page 10)	150,000	$3,411,532
	Guano (page 10)	54,000	1,762,389
	Nitrates (page 10)	2,657,135	30,013,199
		2,861,135	35,187,120
S. F. J. C., 90	Wheat and flour from San Francisco (page 10)	692,500	21,527,725
	Total	3,553,635	56,714,845

We have remaining a valuation of $768,395,322 as the balance of the table on page 6 for which to determine a tonnage equivalent.

For this purpose we have much information that is of importance in relation to averages of value. The total foreign commerce of the United States for year ending June 30, 1889, is reported as follows (merchandise only):

References	Entered and cleared.	Tons.	Imports and exports.	Value.
C. & N., 810	Entered, cargo only	12,913,400	Imports	$745,131,652
C. & N., 812	Cleared, cargo only	14,263,430	Exports	742,401,375
	Total	27,176,830		1,487,533,027

Average value, $54.74 per ton.

Complete statistics for Great Britain, France, and Germany are as yet accessible only for the year 1888. In that year the commerce of Great Britain with other countries is reported as follows:

References.	Entered and cleared.	Tons.
S. Y. B., 85	Entered, cargo only	27,077,000
S. Y. B., 85	Cleared	31,664,000
	Total	58,741,000

References.	Imports and exports.	Value.
S. Y. B., 79	Imports	$386,582,026
S. Y. B., 79	Exports	298,047,374
	Total	684,629,400

Average value, £11 13*s.* 2*d.*=$58.28.

Of France the commerce is reported as follows (foreign trade by sea):

References.	Entered and cleared.	Tons.
S. Y. B., 488	Entered, cargo only	13,537,734
S. Y. B., 488	Cleared	9,354,225
	Total	22,891,959

References.	Imports and exports.	Value.
		Francs.
S. Y. B., 486	Imports	3,629,000,000
S. Y. B., 486	Exports	2,955,000,000
	Total	6,584,000,000

Average value, 288 francs=$57.60.

S. Y. B., 549. Of Germany the only statistics which are in a form available for use are those of the port of Hamburg, which is the principal port of entry of the German Empire. Out of a total tonnage of 17,489,235 tons entered and cleared at the seven principal ports of Germany in the year 1888, Hamburg is credited with 8,846,117 tons, being over 50 per cent. of the whole. For some reason not stated no return is made of the value of exports, but the value of imports at that port is given as follows:

S. Y. B., 577.	Imports by sea, weight	kilos..	3,884,422,400
	Exact equivalent	tons..	3,823,786
	Value	marks..	1,114,906,000

Average value, 291 marks = $72.75.

We have, then—

Countries.	Tons.	Per ton.
Great Britain	58,741,000	$58.28
France	22,891,959	57.60
Germany, Hamburg (imports only)	3,823,786	72.75
United States	27,176,830	54.74
Total	112,633,575	
Average		57.77

Statistics of the commerce of the British Colonies in Australia and New Zealand may be regarded as free from exaggeration of the repeated entries and clearances, before mentioned, as vitiating returns of tonnage on the Pacific coast. From them we gather the following data:

Commerce of New Zealand in 1888.

References.	Entered and cleared.	Tons.
S. Y. B., 254	Entered, cargoes	456,237
S. Y. B., 254	Cleared, cargoes	524,874
	Total	981,111

References.	Imports and exports.	Value.
S. Y. B., 252	Imports, exclusive of specie	£5,430,050
S. Y. B., 252	Exports, exclusive of specie and gold	6,487,897
	Total	11,917,947

Average value, £12 3*s.* = $60.75.

The commerce of Queensland, Australia, in 1888 was:

References.	Entered and cleared.	Tons.
S. Y. B., 262	Entered	478,5[illegible]
S. Y. B., 262	Cleared	517,7[illegible]
	Total	996,229

References.	Imports and exports.	Value.
S. Y. B., 261	Imports	£6,646,738
S. Y. B., 261	Exports	6,126,362
	Total	12,773,100

Average value, £12 16*s.* 5*d.* = $64.10.

The commerce of Victoria in 1888 was:

References.	Entered and cleared.	Tons.
S. Y. B., 286	Entered	2,182,071
S. Y. B., 286	Cleared	1,125,812
	Total	3,307,883

References.	Imports and exports.	Value.
S. Y. B., 284	Imports	£23,972,134
S. Y. B., 284	Exports	13,853,763
	Total	37,825,897

Average value, £11 8*s*. 6*d*. = $57.10.

The commerce of New South Wales in 1888 was:

References.	Entered and cleared.	Tons.
S. Y. B., 237	Entered	2,414,750
S. Y. B., 237	Cleared	2,350,669
	Total	4,765,419

References.	Imports and exports.	Value.
S. Y. B., 235	Imports	£20,885,557
S. Y. B., 235	Exports	20,859,715
	Total	41,745,272

Average value, £8 15*s*. 5*d*. = $43.85.

In the returns of the Australian colonies the tonnage of vessels arriving and clearing in ballast and of specie and bullion exported and imported are not separated from the general aggregates, and make the average of tonnage valuation obtained from them less useful than those obtained from the commerce of the four great nations; but the including of specie and bullion in export values overbalances the including of vessels entered and cleared in ballast, and the tendency is to make an increased average value. This is demonstrated by the returns of New Zealand as compared with those of Victoria and New South Wales. They serve, then, notwithstanding their defects, to corroborate the other estimates in a general way, although they are not of specific value in themselves.

The commerce of New Zealand, of which the statistics are properly divided, showing the tonnage of cargoes entered and cleared and the values of imports and exports, exclusive of specie, bullion, and gold and silver, shows an average value of $60.75 per ton. It embraces in its aggregate all the commodities, in similar proportions, which go to make up the commerce of other Australian countries, and its average, therefore, is of direct value.

Deducting from the total tonnage and the total value of the commerce of Europe, which amounts to 85,456,745 tons, at a valuation of $5,018,674,000, the total tonnage and value of the nitrates, wheat, etc.—say 3,553,635 tons, valued at $56,714,845—which goes almost entirely to Europe, and which has been deducted similarly from the table of values, the average value per ton of the remainder is $60.59.

From these data, which approximate each other so closely, we may safely assume $61 to be a full valuation for determining the equivalent tonnage of the $768,395,322, remainder of the table of tributary commerce. We have then the following results:

	Tons.
Equivalent of $768,395,322, $61 per ton, average value	12,596,644
Tonnage of Hamburg with Australia, not appraised in table	65,300
Tonnage of nitrates, etc., South America	2,861,135
Tonnage of wheat and flour, San Francisco	692,500
Tonnage between Atlantic and Pacific coasts, United States of America and British Columbia, etc	275,000
Total	16,490,579

To this must be added an estimate of the export tonnage from Asia to Great Britain. As many commodities of high value, such as teas, silks, and spices, enter more largely into this trade, in order to convert its value, we may properly advance the tonnage equivalent. One hundred dollars per ton will be sufficient valuation.

The exports to Great Britain for the year 1888 from the following countries were as below:

References.	From—	Value.	Equivalent in United States money.
S. Y. B., 139	India	£30, 763, 677	$153, 818, 335
S. Y. B., 104	Ceylon	2, 532, 999	12, 664, 995
S. Y. B., 158	Straits settlements		29, 200, 349
	Total		195, 683, 679

Equal, at $100 per ton, to	tons	1, 956, 837
To which add tonnage already estimated	do	16, 490, 579
Add for increase of coal-oil exports to Japan, China, etc.	do	237, 934
Aggregate tonnage		18, 785, 350

We have thus 18,785,350 tons as the aggregate of the enormous traffic which exists to-day, to a greater or less degree, within the zone of attraction of the proposed canal. We have now to consider in what varying measure and to what extent this traffic will be attracted.

It will not be questioned that the trade of the Pacific coast, at least from Callao north, with the United States and with Europe will seek the canal as its most advantageous route, provided charges for its use are not prohibitory. The difference in distance between Callao and Liverpool or Plymouth by ordinary sailing route and

Appendix A.

by the line of the Nicaragua Canal is 4,090 nautical miles. Allowing 110 miles per day as the average capacity of a sailing vessel of 2,000 tons register, and double that, or 220 miles per day, for a freight steamer of like capacity, this saving of distance is equivalent to a saving of thirty-seven days' time for a sailing vessel, or eighteen and a half days for a steamer.

As the increased capacity and speed of the steamship is proportionately counterbalanced by increased original cost and increased expense of operation, perhaps a full illustration of one class of vessel will be sufficient to warrant an arbitrary statement of premises concerning both.

A sailing vessel of 2,000 tons register will cost for construction, equipment, etc., about $60 per ton, say $120,000.

Twenty-four per cent. per annum is the usual allowance of cost for the following items:

	Per cent.
For interest on cost	6
Insurance	8
Annual depreciation, etc	10
	24

Charge for these items, instead of 24 per cent., say 20 per cent = $24,000 per annum, or $66.40 per day.

For wages and subsistence the cost will be about $1,000 per month, or, say $33.33 per day. Total, say $100 per day.

But such a vessel on a long voyage will lie from thirty to sixty days in port loading and discharging cargo, and this time is equally chargeable to the voyage. Allowing, then, one hundred and twenty days as sailing time between New York or Liverpool and San Francisco by way of Cape Horn, and forty days in port (less than the average) we have one hundred and sixty days for the voyage at a cost of $100 per day $16,000
Add part charges, say 4,000

Total cost, say 20,000

Freights pay from $7 to $10 per ton, according to market; assuming $8 as a low rate, a 2,000 ton vessel will earn on her cargo of about 3,000 tons,

Say	$24,000
Deduct expenses	20,000
Profit, at low estimate, per voyage	4,000

The following is an estimate of the saving which would be made by the use of the canal between the ports of San Francisco and Liverpool:

		Miles.
Appendix A.	Distance from Liverpool to San Francisco, by Cape Horn	14,690
	Distance from Liverpool to San Francisco, by Nicaragua route	7,694
	Distance saved	6,996

Equal to, at 110 miles per day, more than sixty-three days; that is to say, sixty-three one-hundred-and-sixtieths of the expenses of the voyage may be saved, or about $6,300, to which must be added an equal proportion of the profits of the voyage because of the increased voyaging capacity through lessened distance, say $1,580, showing $7,880 as the immediate advantage to the shipowner alone of the use of the canal between San Francisco and Liverpool; at higher freight rates the advantage would be proportionately increased—but there are other advantages which can not be so easily computed, yet which will be of great weight in turning the current of trade into this new channel. The increased safety of the voyage and reduced rates of insurance to both shipowner and merchant, and with the merchant, the ability to turn his capital so much more frequently, are arguments of the weightiest importance, which can not be measured by dollars and cents in anticipation, except theoretically, yet added to the facts before stated which are ascertainable, they serve to multiply the evident advantages of the canal route.

There can be no question as to the advantage of the canal to Northern ports; there may be some as to how far south it may be considered preferable to the route around Cape Horn. We do not doubt but that its influence will be felt much farther than is demonstrable, but it is better not to claim too much, for that which can clearly be claimed is abundantly sufficient to satisfy the most exacting inquirer.

We ask attention to the following facts concerning the nitrate trade:

S. Y. B., 809 Cubic nitre is worth at place of production, say from $3 to $3.23 per ton, a low-priced commodity, and freights by sailing vessels are about 32*s.* 6*d.* to 40*s.*, say $8 to $10. In 1888, Peru shipped to Great Britain 1,773,135 tons from the different ports along the coast from Callao to Iquique.

		Miles.
Appendix A.	The distance from Callao to Liverpool, by Cape Horn, is	10,539
	By Nicaragua Canal route it is	6,449
	Distance saved	4,099

	Days.
Time saved at 110 miles per day, thirty-seven days out of a voyage of, sailing days	96
In port	40
	136

Estimating expenses as before, at $100 per day—

They amount to	$13,600
Port charges, say	4,000
Total	17,600
Freight, three thousand tons, at $8	24,000
Profits of voyage	6,400

We have the following as the advantage by use of the canal route:

37-136 of expenses saved	$3,700
37-136 of profits to be added	1,800
Gain	5,500

Allowing a charge of $2.50 per registered ton as the canal toll, it would pay the shipowner at least $500 to use the canal coming from a port as far south as Callao. To vessels from ports within that limit, and to vessels of less tonnage, the ratio of advantage would be proportionately greater. The advantage to the shipper may be computed as follows: Allowing such a ship's cargo (2,000 tons register) to be worth $150,000, that is to say, at the rate of $50 per ton for the cargo carried, which is much below the average, the saving in interest, at 6 per cent per annum, and insurance at 4 per cent per annum, for the thirty-seven days, would be over $1,500, to be added to the $500 advantage to the shipowner. On a cargo valued only at $50,000, which would necessarily be made up very largely of nirate at a low valuation, the saving would be $500 to the shipper, the advantage to the shipowner being the same in either case.

In view of these facts, we may regard the trade of Peru and of the Pacific coast of the American continent north from Callao as entirely tributary to the canal.

South of Callao it will become gradually less so until canal tariffs overbalance its benefits, but exactly at what point the division will take place only experience can determine.

It does not seem that further illustrations are necessary; the same methods may be applied to any and every case in which it may be desired to test the advantages of the canal; but investigation shows that where the saving in distance approaches 2,800 miles for a 2,000-ton vessel with a cargo worth $150,000 or over, there will be an advantage to the shipowner and the shipper conjointly, in the use of the canal at a toll of $2.50 per registered ton. To decrease the rate would extend its influence still farther and increase the tributary tonnage in more than a proportionate rate, for the added zone of attraction would be on the outside of an already widely extended circle, stretching out into rich and densely populated territory in Asia. Even at $2.50 per ton it is not impossible that the difficulties of the passage around Cape Horn and advantages of insurance, etc., may bring the trade of Valparaiso as well as of Callao within the zone of strong attraction; we have, however, preferred to treat it, so far as Europe is concerned, as belonging to a class likely to contribute to the canal not more than one-fourth of its volume.

If it be asked: How shall the shipper and the merchant avail himself, each of his representative share, of the advantage to accrue? The answer is: As they have done in the past.

A quarter of a century ago the merchant bought his teas in Hong-Kong or elsewhere, insured and shipped them home; each transaction was the subject of a separate negotiation. To-day he buys them at what is known in New York as a C. F. and I. price, that is to say, Cost, Freight, and Insurance included. The shipper profits by any reduction in insurance or freight which he may be able to obtain, and adjusts his price with reference to it and to promptness of delivery. On the other hand, the buyer suffers no risk of change in freight rates nor any of the embarrasments and costs of rehandling at any intermediate point. This new method of purchase and sale has grown up entirely in connection with the requirements of transcontinental traffic. In like manner trade will provide a satisfactory method to profit by any advantage properly belonging to herself in connection with the canal, probably by a C. T. and I. price, that is to say, Cost, Tolls, and Insurance included; or, if not in that way, then by some more suitable method.

It will aid in arriving at a proper distribution of the traffic if we divide it into three classes, considering the facts just illustrated.

First class: That which will be *entirely* tributary to the canal;
Second class: That which will be *largely* tributary; and,
Third class: That which will be so *partially* and perhaps only in a small degree.
In making the distribution we make use of data already given.
In the first class, that of *entirely* tributary commerce, we place the following:

	Tons.
Trade between Atlantic and Pacific ports, United States, etc., not included in table of values; estimated at	275,000
Trade of Pacific ports with Great Britain, France, Germany, Belgium, Cuba, and Brazil, tabulated at $42,252,304. (In this total is included the value of the wheat export from San Francisco.) It should therefore be divided as follows:	
$21,527,725 wheat and flour, reported at	692,500
$20,724,579, estimated at $61 per ton	339,747
Trade of Atlantic ports of the United States with Hong-Kong, China, Japan, British Australasia, Philippine Islands, Hawaii, Peru, Ecuador, and Chili, amounting to $54,003,533. This also may be divided as follows:	
$6,456,448 for coal oil (C & N., 292)	322,626
$47,547,085, estimated at $61 per ton	779,460
(The division is made for the purpose of adding the increase of coal-oil shipments for the years 1889–'90, which were over 50 per cent greater than those of 1888–'89, as shown by British consular reports of receipts in China, Japan, and British East Indies.)	
Add, therefore, for existing coal oil traffic, 1889–'90, 50 per cent of 322,626 tons	161,313
Coal oil to British, French, and Dutch East Indies from Atlantic ports for 1888–'89 (see Second Class C. & N., 292) 343,242	
Add 50 per cent increase 1889–'90 176,621	
	519,863

(United States Government reports give the export of coal oil, crude and refined, to the countries named for 1888–'89 at 665,868 tons. Messrs. Frazar & Co., of Yokohama, show an increase of shipments received in China, Japan, and British East Indies during 1889–'90 of 294,937 tons, or over 61 per cent increase.)

	Tons.
Trade of Great Britain with Ecuador, Peru, and Bolivia, amounting to $19,003,610. This must also be divided as follows:	
$5,225,170 for nitrates and guano	1,911,433
$13,778,390, estimated at $61 per ton	225,884
Trade of Belgium with Peru, $6,440,905, at $61 per ton	105,589
Total first class, entirely tributary, tons	5,333,415

SECOND CLASS—*largely tributary.*

General business between British, French, and Dutch East Indies and New York, $30,127,664.	
Of this total a part has already been considered as belonging to Class 1, viz, the exports of coal oil from Atlantic ports of the United States; there is, therefore, to be deducted $6,275,800 for its value, leaving $23,841,864 which, at $61 per ton, is equal to 390,850 tons, of which we may assume one-half as tributary	195,425
The trade of Central America with the United States will also take place in this class. In 1889 it amounted to $5,170,980, at $61, equal to 84,770 tons, but as much of it is coastwise with San Francisco, and considerable of it fruit from the Caribbean coast to New Orleans and New York, we may take one-quarter only as tributary say	21,192

The trade of Great Britain with Hong-Kong, China, Japan, the Australian colonies, New Zealand, Tasmania, Philippine Islands, Chili, and Central America will be attracted in proportion to distances. It amounts to $457,059,308. This should be divided as follows:

		Tons.
Exports of nitrates, guano and wheat, value	$29,962,470 =	950,000
Remainder	427,096,838, at $61 =	7,001,588
		7,951,588
Take one-quarter		1,987,899

Trade of France with New Caledonia, Japan, and Chili, amounts to $27,184,683, at $61 equal to 445,650 tons; take one-quarter	111,412

	Tons.
Trade of Germany with Australia, Japan, and Chili, amounts to $29,106,392, at $61 equal to	477,154
Add Hamburg with Australia	65,300
	542,454
Take one-quarter	135,614
China with Germany, France, and Europe, $18,283,315, at $61 equal to 300,000 tons; take one-quarter	75,000
Total second class	2,526,542

THIRD CLASS—*partially tributary.*

In this class we may include—	
Trade of Spain with Philippine Islands	$4,123,000
Trade of Netherlands with Dutch East Indies	66,080,000
Trade of Great Britain with Java	22,358,760
Trade of San Francisco with China, Japan, etc	43,915,593
Total	136,477,353

	Tons.
At $61 equal to	2,237,333
To which add for British imports from India, Ceylon, and Straits settlements, as estimated	1,956,837
Total	4,194,170
Of which take one-sixteenth; total third class	262,136

SUMMARY.

	Tons.
First class, entirely tributary	5,332,415
Second class, from tonnage largely tributary	2,526,542
Third class, from tonnage partially tributary	262,136
Total	8,122,093

This is an approximate estimate of the tonnage existing in 1889 and to-day, which the canal might expect to control if it were open to traffic.

M. Levasseur and his associates in 1879 estimated that the tributary tonnage which might be anticipated for 1889 was 7,250,000. Facts more than confirm their expectations, and demonstrate the propriety of their method.

A study of the Table of Distances appended,* and a consideration of the influences operating, will show the principle upon which the division into classes has been made. In taking the fraction of the respective aggregates which the second and third classes may be expected to contribute, we have claimed less, rather than more, than a reasonable expectation would allow. It is with regard to the third class only that any explanation seems necessary as to the reasons which have suggested the claiming a portion of it as tributary. A majority of the trade in this class originates beyond the recognized dividing line of 110 degrees east from Greenwich, especially the trade of India, and can not be expected to pay any large tribute to the canal, except, perhaps, of at a rate as low as that of the Suez Canal, whereas we have assumed $2.50 as the probable toll. The tolls of the Suez Canal, all charges included, amount at present to about $1.96 (9.80 francs) per registered ton. The trade of the Philippine Islands with Spain is not open to the same objection, but, on the other hand, her Mediterranean ports are nearer than the Atlantic ports of that country or of Europe. We have referred to the prevailing winds and ocean currents, and the more favorable temperature of a passage by the Nicaragua Canal rather than by the Red Sea and Suez. These are reasons of some importance in controlling direction. In addition to these reasons much of the business considered is carried in sailing vessels which do not go by the Red Sea route at all; they have to double one or the other of the capes. To them the Nicaragua Canal and prevalent winds and currents will afford advantages which to a steamer might not be of so great importance. Moreover, there is a large traffic which now goes from this region, first to England or other parts of Europe and comes to us from thence, which, when the canal is open, must and will come direct. Large quantities of plumbago used in the foundries throughout our country is carried from Ceylon, where it is mined, to England, and then sent here to supply our needs; thousands of tons of straw braids from China, and other commodities from other parts follow the same route. These are the sufficient reasons for assuming to claim a portion, and we have claimed only a very small portion, of the enormous trade of these remote points.

Thus far we have considered the question with reference only to what exists to-day, and our conclusions are based upon statistics for the years 1888 and 1889. Allowing that the canal will be ready for traffic in the year 1897, and admitting our estimates to include all increase realized in 1889 by the countries whose statistics are given only for 1888, we have eight years growth of commerce to make allowance for in estimating the amount of business which at the opening of the canal will be ready for transit.

For the ten years, of which 1888 was the last, the commerce of the four great commercial nations shows the following increase:

Countries.	1879.	1888.
Great Britain	$2,977,204,200	$3,336,087,844
France	1,917,186,874	1,830,682,200
Germany	1,841,726,925	2,306,258,318
United States	1,278,762,621	1,417,172,421
Total	8,014,880,620	8,890,200,783

Increase, $875,320,163, or about 10.9 per cent.; prices of staple commodities have changed but little during the time, except that wheat is about 10 cents per bushel lower, but they have rather declined than advanced. The tonnage equivalent would therefore not be materially changed. We may then estimate the advance for the years 1888 to 1897, both years included, say nine years, at 10 per cent. But this

* Appendix A.

is only normal growth, and for reasons worthy of consideration, we have the right to expect more than a normal growth of the commerce to which the Nicaragua Canal will afford a means of transit.

With the opening of the canal not only will a new route be provided, but new fields will be opened for commerce as well as more advantageously provided for.

The products of our Alaskan possessions, as well as of Washington and Oregon, mostly low-priced commodities furnishing a large bulk of tonnage, will be brought at less cost to eastern markets, the markets of the western coast of South America will be opened to the low-priced coals of our Southwestern States, and the coasting trade now carried on with the West Indies to the extent of over 500,000 tons per annum will be multiplied beyond calculation. If a traffic of 500,000 tons has been developed within the limits of the Caribbean Sea, what may be expected when the markets of the Pacific coast of Colombia, Mexico and Central America, of the States of Ecuador, Peru, Bolivia, Chili, and of Southern California are opened to easy access for our coasting vessels?

In our existing lake and coastwise trade, steel barges carrying from 1,500 to 3,000 tons freight, transported by powerful tugs, are taken at low cost to market points, and there left to discharge and reload for a return voyage, while their motive power returns without delay with freights, in similar barges, made ready for departure before its arrival. Thus movement of freight is accelerated, invested capital is made to yield its largest returns, shippers profit by the possibility of lower rates, and consumers by the possibility of lower prices. Under such methods the traffic of the Sault Ste. Marie Canal has developed from 1,802,571 tons in 1881 to the enormous aggregate of 7,221,935 tons in 1889, and is exceeding the ratio of that year for 1890. And this traffic has grown up in connection with the internal trade only of a portion of our Northwestern States with the East. Like results will follow similar methods, which are equally possible in the waters opened by the Nicaragua Canal, and American enterprise will not be slow to avail itself of the unprecedented opportunity. What people ever have had such an opportunity put before them? To-day England is practically as near the markets of western South America as we; to-morrow we shall be 7,000 miles nearer than she is to-day in a distance of 10,600 miles by existing routes. We shall still have the advantage over her of the Atlantic's width when the canal is opened, nearer by so many miles to a market for our cotton goods and manufactures of every kind, with machinery, agricultural implements, furniture, woolen goods, carpets, and coal to sell, and the needs of 75,000,000 of people at home to furnish a reciprocal market for the products which they have to offer us. But this is not all, perhaps only the smaller portion of the whole. We have only briefly mentioned the products of our own possessions north of California, the forests and fisheries of Oregon, Washington, and Alaska, and the products of British Columbia.

The salmon pack of British Columbia, Alaska, Washington, Oregon, and California amounted in 1888 to 1,683,800 cases, about 84,200 tons, valued at $9,064,000, exceeding in quantity the pack of 1888 by 527,000 cases; 680,000 cases of the product was from Alaska, and 422,000 from British Columbia. This is a growing industry. The pack amounted in 1880 to only 679,490 cases; in ten years it has increased nearly 250 per cent.; by 1897 at the same ratio of increase it will amount to nearly 3,500,000 cases. Hop growing as an industry was commenced in Oregon and Washington in 1865. Last year the product was 70,000 bales, regularly quoted and competing with other goods in the New York market. The fur-seal and whale fisheries are also growing and important industries.

The cultivation of India rubber in Central America and on the western coast of California is already attracting attention. The increasing demand for the gum and the destruction of trees in their natural state by the reckless huleros or native gum gatherers, makes attention to an artificial supply for future demands of manufacture imperative. Already large manufacturing corporations in this country are making plantations to meet it. The huleros are so careless that not only are they destructive of the trees but much of the gum brought by them to market is in bad condition and commands only 26 cents per pound, whereas when properly collected it is worth as much as 80 cents for the best quality. The tree grows naturally in Central America and Mexico. The western coast of the last-named country, between the ocean and 1,800 to 2,000 feet of elevation above the level of the sea, seems particularly favorable to its best development. A plantation is made with shoots gathered in the forests, and with proper care will be in condition to yield a crop in six or seven years; a tree in good condition yields 10 to 12 pounds per annum, and, if not maltreated, continues to yield year after year, apparently without limit. Its yield is worth, according to quality—which depends chiefly upon its treatment—from 50 cents to 80 cents per pound. This, too, is an industry which will pay tribute to the canal.

But in the forests of the northwestern Pacific coast there is material which needs only the facilities of the canal for its transportation to a favorable market to yield a tonnage which alone will probably exceed that of all other industries combined. The wonderful growth of the lumber trade of that section under present limitations

of transportation is an indication of the magnitude to which it will grow with the opening of new and more extended markets by the shortening of distances to them on lines within the still waters of the temperate and torrid zones, instead of by the routes now existing through the tempestuous seas of the storm zone.

E. P., 3, 24, '88. In 1886 the shipment of lumber from Oregon amounted to 6,000,000 feet, equal to 12,500 tons; in 1887, to 48,000,000 feet, equal to 100,000 tons. In 1888 the amount cut amounted to 706,985,000 feet, and the shipments abroad to 471,325,000 feet, equal to 981,925 tons, or nearly 1,000,000 tons.

Concerning the lumber trade with eastern markets, the Post-Intelligencer, of Seattle, Wash., publishes the following under the dates indicated:

July 11. The Sound sawmills (Puget Sound) have lately been filling special eastern and southern orders for extra length stuff. Quite a large number of huge spars have been lately shipped from Sound ports to the east, where there is ever an active market sale for that material.

July 14. The Puget Sound cedar shingles were first endered in the eastern markets five years ago. The demand for them has ever since steadily increased, and now shingle mills all over the Sound are shipping their product east as far as Ohio (*i. e.*, at railroad rates).

The forests of Maine no longer yield the timber needed for masts and spars of large vessels. In the forests of Oregon trees grow to 12 feet in diameter and 300 feet in height. The average length of sticks to Boston from Puget Sound by the bark *Crapo*, in the cargo, the arrival of which has been already mentioned, was 126 feet, and their average diameter 39 inches. Sixty of the sticks were bought by a shipbuilder of Bath, Me., and were made into a raft and towed around to his yard. This fact shows how depleted the Maine forests are of spar timber. Cuba has attempted the importation of lumber for building purposes around Cape Horn, but found the experiment too costly to be continued. In our Southern States their own hard pine, though less desirable, is taking the place of soft pine because of advancing prices. All these demands will be met and supplied from the Oregon and Washington lumber fields with the opening of the canal. Any estimate of what the demand and supply would aggregate is mere conjecture, but considering as a whole the coastwise trade, including mahogany, rosewood, ironwood, and teak of Southern Pacific coasts, the growing trade of Central America in coffee, cocoa, India rubber, mahogany, and other hard woods, the furs of Alaska, and the seal fisheries, whale oil, wheat, canned salmon, and other products of British Columbia, Washington, and Oregon, spar timber and other lumber from the forests, and our outbound trade in coal, textile fabrics, agricultural implements, machinery, iron goods, etc., 1,000,000 tons per annum will seem a very small estimate to put upon it.

Aggregating the various items thus estimated we have the following:

SUMMARY

Of trade which will be subsidiary to the canal at its opening:

	Tons.
Traffic existing in 1889, as estimated	8,122,093
Natural growth of same by 1897 (10 per cent.)	812,209
New business developed by opening of the canal	1,000,000
Aggregate	9,934,302

Which may be considered as traffic properly belonging to the canal, and to be drawn by it from the total of the commerce within the zone of its attraction in 1897.

	Tons.
The aggregate of tonnage within this zone of attraction in 1889 amounted to	18,785,350
Deduct subsidiary traffic existing in 1889	8,122,093
And there remains	10,663,257
To which must be added 10 per cent for growth in 1897	1,066,326
And we have as a remainder	11,729,583

From which the canal, after its opening, may further add to its traffic in such degree as its tolls and the practical development of other controlling influences may determine.

APPENDIX A.

Table showing distances in miles between commercial ports of the world and distances saved by the Nicaragua Canal.

From—	Via Cape Horn.	Via Cape of Good Hope.	Via Nicaragua Canal.	Distance saved.
New York to—	*Miles.*	*Miles.*	*Miles.*	*Miles.*
San Francisco	14, 840	.....	4, 946	9, 894
Bering Strait	17, 921	.....	8, 026	9, 895
Sitka	16, 105	.....	6, 209	9, 896
Acapulco	13, 071	.....	3, 122	9, 949
Mazatlan	13, 631	.....	3, 682	9, 949
Hong-Kong	18, 180	15, 201	11, 038	4, 163
Yokohama	17, 679	16, 190	9, 363	6, 827
Melbourne	13, 502	13, 290	10, 000	3, 290
New Zealand	12, 550	14, 125	8, 680	3, 870
Sandwich Islands	14, 230	.....	6, 388	7, 842
Callao	10, 689	.....	3, 701	6, 988
Guayaquil	11, 471	.....	3, 053	8, 418
Valparaiso	9, 750	.....	4, 688	5, 062
New Orleans to—				
San Francisco	15, 052	.....	4, 047	11, 005
Acapulco	13, 283	.....	2, 409	10, 874
Mazatlan	13, 843	.....	2, 969	10, 874
Guayaquil	11, 683	.....	2, 340	9, 343
Callao	10, 901	.....	2, 988	7, 913
Valparaiso	9, 962	.....	3, 987	5, 975
Liverpool to—				
San Francisco	14, 690	.....	7, 694	6, 996
Acapulco	12, 921	.....	5, 870	7, 051
Mazatlan	13, 481	.....	6, 430	7, 051
Melbourne	13, 352	13, 140	12, 748	392
New Zealand	12, 400	13, 975	11, 349	1, 051
Hong-Kong	18, 030	15, 051	13, 786	1, 265
Yokohama	17, 529	16, 040	12, 111	3, 929
Guayaquil	11, 321	.....	5, 890	5, 431
Callao	10, 539	.....	6, 449	4, 090
Valparaiso	9, 600	.....	7, 436	2, 144
Sandwich Islands	14, 080	.....	9, 136	4, 944
Spain to Manilla	16, 900	13, 951	13, 520	431
France to Tonquin	17, 750	15, 201	13, 887	1, 314
Hamburg to—				
Mazatlan	13, 931	.....	6 880	7, 051
Acapulco	13, 371	.....	6, 320	7, 051
Fonseca	11, 430	.....	5, 530	5, 900
Punta Arenas, Costa Rica	11, 120	.....	5, 515	5, 605

From—	To eastern entrance of Nicaragua Canal.	From—	To western entrance of Nicaragua Canal.
	Miles.		*Miles.*
New York	2, 021	New Orleans	1, 308
Liverpool	4, 769	San Francisco	2, 776
Hamburg	5, 219	Valparaiso	2, 518
Amsterdam	4, 994	Callao	1, 531
Havre	4, 874	Portland	3, 219
Cadiz	4, 220	Victoria	3, 428

NOTE.—The distances have been measured by customary routes most convenient for sailing ships and slow freight steamers.

APPENDIX B.

AUTHORITIES AND ABBREVIATIONS.

C. & N.—Annual Report on Foreign Commerce and Navigation for year ending June 30, 1889. Treasury Department, U. S. A., Government Printing Office, 1890.

S. Y. B.—The Statesman's Year Book of Facts for 1890, MacMillan & Co., London and New York, 1890.

Lev. —Rapport de M. Levasseur sur le Commerce et le Tonnage relatifs au Canal Interocéanique, lu en Séance Generale du Congres Internationale, 1879.

E. P. 3, 24, '88. —Evening Post, March 24, 1888, Article on the Nicaragua Canal; figures from U. S. Bureau of Statistics, year ending June 30.

S. F. J. C. '90. —San Francisco Journal of Commerce, Annual Review, February 6, 1890.

HEARING BEFORE A SUBCOMMITTEE OF THE COMMITTEE ON FOREIGN RELATIONS OF THE UNITED STATES SENATE, THURSDAY, MAY 22, 1890, IN RELATION TO THE NICARAGUA CANAL COMPANY.

The subcommittee met at 1 o'clock p. m. Present: Senator Edmunds (chairman), Senator Dolph, and Senator Payne.

Senator Edmunds read the following resolution:

IN EXECUTIVE SESSION, SENATE OF THE UNITED STATES,
April 11, 1890.

Resolved, That the Committee on Foreign Relations be, and it hereby is, directed to inquire into what steps have been taken under the act of Congress entitled "An act to incorporate the Maritime Canal Company of Nicaragua," approved 20th February, 1889, and what are the present condition and prospects of the enterprise; and to consider and report what, in its opinion, the interests of the United States may require in respect of that interoceanic communication.

Attest:

ANSON G. MCCOOK,
Secretary.

STATEMENT OF HON. WARNER MILLER.

By Senator EDMUNDS:

Q. What, Mr. Miller, is your present relation to the company that I assume was organized under the act of Congress to incorporate the Maritime Canal Company of Nicaragua, approved February 20, 1889?—A. I am the president of what is known as the Nicaragua Canal Construction Company.

Q. What sort of company is that, and under what law organized?—A. That company is organized under the laws of Colorado—a general law of the State.

Q. Have you a copy of the articles of your association here present?—A. I have not.

Q. Who is the president of the Maritime Canal Company of Nicaragua?—A. Mr. Hiram Hitchcock.

Q. What are the relations between your construction company and the canal company organized under this act of Congress?—A. The canal construction company, of which I am president, has contracted with the Maritime Canal Company to build the canal.

Q. Well, was a company organized under this act of Congress? I thought until this moment you were president of that company.—A. The Maritime Canal Company was regularly organized under that act and exists to-day, having its offices and board of managers, and has fully complied with the law.

Q. And Mr. Hitchcock is the president of that company?—A. He is the president of that company.

Q. Do you know who make up the whole body of directors of the company organized under the act of Congress?—A. Mr. Hiram Hitch-

cock, Mr. Hotchkiss, Mr. Stout, Admiral Ammen, Mr. Goodwin, Mr. Fairbanks, the Nicaraguan minister and others.

Senator PAYNE. Suppose you furnish a list with full names and residences.

Mr. MILLER. I will do so with pleasure.

By Senator EDMUNDS:

Q. You, then, Mr. Miller, as the president of the Construction Company, have undertaken to do the work, so far as it is yet provided for, of the company organized under this act of Congress?—A. Yes.

Q. Now, will you please tell us how much money, so far as you know, has been actually raised that can be drawn upon, and how far you have expended it, and what has been done on the Isthmus down there, in detail—not minute detail, of course—but so that we can see just how far you have got on and what you are doing. State it in your own way.—A. Before the granting of this charter by Congress an association of gentlemen existed, the Nicaragua Canal Association, who subscribed money which was used for making the preliminary surveys, and for all the work pending the securing the concession from the Government of Nicaragua. That association raised and expended between a quarter and half a million dollars—I have not the exact figures, but prooably in round numbers not far from $300,000—in making surveys in order to settle to their own satisfaction as to whether a canal could be built and the work that was necessary to secure a concession. After that was completed, the Construction Company was organized, and they raised the money which has been expended upon the canal during the first year. That stock was all properly subscribed for and had been paid in by installments, until now there remains two installments of 10 per cent. to be paid in upon that. Out of that money the work has been carried on during the past year.

(Memorandum.—Mr. Miller here produced a pamphlet entitled "Maritime Ship Canal, Nicaragua, 1890," with inclosed maps and delineations, and referred to map marked A, representing, on a small scale, both oceans and Lake Nicaragua, Greytown, Brito, and the river.)

Mr. MILLER. I will make a general description of what we have done and ask Mr. Menocal to give you a more detailed account of the engineering work that has been done and is in progress. A year ago the first expedition of the new company was sent out to Greytown, and that expedition established our headquarters at a point where the Nicaraguan Government decided the entrance of the canal should be, proceeded to erect warehouses, barracks, headquarters for the officers and the engineering corps, and also a hospital. From this site we sent out six engineering parties, consisting of six engineers and twenty men each, who have been constantly engaged in the location of the canal and making the surveys, so much in detail as to enable the company to lay before contractors completed details of the work.

Q. That, then, is the actual work of location?—A. Yes. Aside from the engineering work the first work undertaken with the canal proper has been that of opening the harbor at Greytown. The harbor at Greytown has been closed for twenty-five years by a bar being formed across the mouth of it. All communication had to be had by ships lying outside and going in in small boats and lighters.

Q. Is that harbor within the area of the mouth of the river?—A. The harbor that we are to occupy——

Q. No, I mean the old harbor. Where is Greytown with reference to the mouth of the river that flows out of Lake Nicaragua?

Mr. MENOCAL. It is at the mouth of one of the outlets of the San Juan River.

Mr. MILLER. The harbor which the company has taken as its harbor and which it has undertaken to improve is the old harbor as it existed twenty-five or thirty years ago, which consists now of an inclosed basin, being entirely shut off from the sea by a bar which has formed across the mouth of it. That harbor is of sufficient capacity for all the vessels that can ever go through the canal—for a large fleet. It has from 14 to 20 feet of water now.

Q. Is that harbor at or near what was formerly one of the northern outlets or at present of the river?—A. Yes; it was the northern outlet and the most important outlet thirty years ago, but that was closed by a bar and the river has broken through to the southeast. The first work done in connection with that was to build a pier or breakwater from the harbor out to a line of 30 feet of water at sea.

Q. Crossing that bar?—A. Crossing that bar, and for the purpose of dredging out a channel alongside the pier when it was constructed.

Q. How far out is that pier?

Mr. MENOCAL. The breakwater will have to be about 2,500 feet long.

Q. Well, how far out from the main-land is this bar?—A. This bar extends 2,000 feet from the main-land.

By Senator DOLPH:

Q. Do you expect to get any greater depth of water in the harbor after opening a channel through the bar?—A. The harbor is to be dredged out to 30 feet, the same as the bar. The first work was to build a pier or breakwater.

By Mr. EDMUNDS:

Q. Wait a minute; I want to find out the hydrography and topography of it inside of this bar, which I will assume to be 2,000 or 3,000 feet out on the shore line. How deep is the water?—A. As I just stated, it varies from 14 to 20 feet.

Q. And on the bar there is only 6 or 8 feet, I suppose?

Mr. MENOCAL. Yes, and even less than that, because this river had broken out at another place and what used to be the outlet is now entirely cut off from the sea.

Q. And the great volume of the water goes to the southeast?—A. Yes.

By Senator DOLPH:

Q. What is the rise and fall of the tide?—A. Only 18 inches.

Q. Is there any considerable swell?—A. Yes.

Q. How does it compare with the coast of California?—A. Very much less. The swell there on the bar is very seldom 4 or 5 feet, and generally very much less.

By Senator EDMUNDS:

Q. Proceed, Mr. Miller, with your general statement of the substance of things you have done and are doing.—A. The company began building this pier or breakwater, which is to extend to the bar and out to deep water, or 30 feet of water at sea. That pier has been extended out about 700 feet. It is constructed first of creosoted piles, which will resist the attacks of the terredo, 40 feet wide, and the piles are driven into the sand at great depth, so as to make it very secure. Then it is

filled in with loose rock in order to make it absolutely secure, and thus far the work has gone on most satisfactorily.

Q. Are there any cross-timbers between the piles?—A. It is all heavily framed together.

Q. Makes a crib in fact, though it is not sunk and piled with pile on the outside?—A. Piled with piles and then to be filled with large rocks eventually. An immense breakwater will eventually cover this entire piling and make it perfectly secure.

Q. So that this crib-work, we might call it, will be protected finally with a riprap?—A. A riprap covering the whole of it. This breakwater is constructed at such an angle as to anticipate the shifting of the sands along the beach, and the channel is to be dredged on what we call the lee side of the breakwater. The first work after the building of this breakwater has now got out to a depth of 12 feet at sea; so we propose to commence now the dredging of the channel through the bar in order that vessels of light draught, like schooners and sailing vessels which we want there with material, may be able to come in and save lighterage. Once inside the bar they are in a perfectly inclosed basin or harbor, with 18 feet of water, entirely sufficient for ordinary vessels.

The contract for dredging this bar and harbor to a depth of 20 feet has already been let, and the first dredges are now on the way to Greytown, having sailed from this country a few days ago. Two other dredges are being built, and will go forward in the course of a few weeks. The first cut across the bar is at a depth of 12 feet of water. That, under contract, is to be completed in one hundred and twenty-five days. Then the second cut is to be 20 feet, and that is to be completed in one hundred and twenty-five days more. When the first cut is made we can get in with schooners and vessels such as we are sending down, and when the second cut is made we shall be able to go in in good-sized steamers. The company thought it wise to do this work first, because one of the important engineering questions was whether a safe harbor could be made at this point. Without trespassing upon Mr. Menocal's statement of engineering work, I will say that this harbor when open will be substantially an inclosed harbor in which the river San Juan will be shut off, having its mouth where it is now, further south and east, so that whatever débris will come down will never be deposited in this harbor, so that when it is once dredged out there is no reason why it will not remain perpetually, because it is entirely an artificial harbor and entirely inclosed.

Q. If I understand you, once the breakwater being built and the cut through the bar into the deeper water inside being made, this very bar itself forms against storms a shelter for vessels, as breaking the seas down?—A. Yes.

Q. So that nature has built this harbor for you, providing you once cut your way into it?—A. Yes, it is a breakwater now.

Q. Now, about what is the size of that inclosed area, that being thus formed will allow vessels to come in where without any dredging you could get, say, 20 feet of water—how broad a space?

Mr. MENOCAL. It is about 2 miles wide by 1 mile as to the size of the the lagoon or basin we are going to convert into a harbor.

Mr. MILLER. It will be a perfect basin 1 by 2 miles.

Q. Now go on, Mr. Miller, and tell us what else you have done.—A. The final line of the canal, the engineering work, has been done down to Ochoa, the dam from which point we use the lake. The distance from Greytown to Ochoa by the line of the canal is 30 miles, and that

engineering work has been substantially completed. The definite line of the canal has been located and the engineers have taken borings of all the cuts that have to be made. Where the rock cut is located we have bored down toward the bottom of the canal at distances of 1,000 feet apart, and we have samples of all the kinds of rock and material, so that we can show the contractors and engineers precisely the kind of material they are to meet with.

Q. This distance of 30 miles brings you to the river below the rapids or to the lake, does it?—A. It brings us to the river, at which point we dam the river where it is on the level of the lake.

Q. From that point where you dam the river below the rapids how far is it to Lake Nicaragua?

Mr. MENOCAL. Sixty four and one-half miles.

Q. What have you done on that line? Have you got water enough?

Mr. MILLER. We have advanced to Greytown, and have been clearing the line of canal of the dense tropical growth and have cleared probably one-half of the distance from Greytown to the first lock, or more than that across the lagoon. This material has all been cut down, a dense growth, and during the late dry weather it has been burned over, so that it is ready for the dredgers. In addition to that we have commenced the construction of a fresh-water aqueduct 13 miles long to bring fresh water from the mountains down to Greytown in order to preserve the health of the men and to give us pure and fresh water.

Q. What sort of an aqueduct is that?—A. This aqueduct is composed of a steel pipe, covered inside and out with asphalt to preserve it from rusting, and it is estimated it will furnish Greytown and all of our ships and barracks and hospitals with pure drinking water.

Q. What about is the length of that?—A. It is about 13 miles in length.

Q. What is the head?—A. One hundred and fifty feet.

Q. That will give you a good head?—A. Yes.

Q. Have you told us about the hospital work, if any, and the state of health, and how many men you have got there altogether, and how the thing has appeared in respect of the possibility of white men living there and carrying on this work?—A. Among the first things that the company did was to organize a medical department and erect hospitals. They had sent the buildings down complete, having been built in New York, and appointed a chief surgeon and four assistants. The result has been that we have a perfect record of the health of all the men who have been in the employ of the company during this year from the hospitals, which have been kept very carefully. There has been no epidemic and no serious sickness on the force at all. The hospital records show that the two principal diseases have been chills and fever and diarrhea, diarrhea caused by the drinking of the bad water in the lagoons, as the men would do of course when they were in camp and surveying parties. The chills and fever seem to have been very light in their attacks, as the records show that the majority of the men going into the hospital have stayed not more than three days or a week, perhaps an average of four to five days in the hospital from chills and fever.

Q. Can you tell us what has been the percentage of mortality since you have been there among all the persons who have been in the employ of the company?—A. I believe that there has not a single person died in the employment of the company from any disease contracted there. One or two men have been killed by the natives and in drunken quarrels.

Q. I mean mortality from diseases of the country?—A. The only case

that can be charged of that, and perhaps not even that, was one mechanic who was sent down from New York and became dissipated and was discharged for drunkenness and sent home, and after being home some weeks he died, it is perhaps not to be charged even to the climate, but all the engineers, all the machinists of all kinds, who are all Americans from the United States, not a single one of them has died there, and sickness has been, as I stated, chiefly due to the two causes and it has been very slight as to them.

Q. Then, if I understand you, you mean to say that, so far as your experience has now gone, with Northerners going down there, the state of the climate is not such as to give any serious apprehension at all?—A. That is the experience of the first year.

Q. Yes, as far as you have gone?—A. And the hospital records very fully show it, and from this time on the conditions ought to be very much better than they have been, because now we have houses and barracks and everything that belongs to a civilized man, and we shall very soon have pure water for all to drink, and we have not any doubt that that will remove almost entirely the cause of diarrhea and dysentery, as to the engineers and machinists who are now there, and have been there for a year and become acclimated; and the late returns from the hospital show that the number of men in hospital is very much less than it was six months ago. There have been on the average during the past year five hundred men in the employ of the company during the whole year.

Q. If you know, tell us what is the highest temperature that is experienced there?—A. Well, I get my information from Mr. Menocal on that, but I understand the highest is not over 95°.

Mr. MENOCAL. Eighty-four or 85 is the average at noon and about 75 in the evening; generally about 75 in the night.

By Senator DOLPH:

Q. That is at Greytown?—A. Yes.

Q. I suppose it is higher as you go into the interior?—A. As you go into the interior it is cooler in some places, and in some places warmer; but I never saw it above 90 or below 70. The lake region is never above 80.

By Senator EDMUNDS:

Q. Well, that is the presentcondition of the thing as it appears on the surface of the earth.

Mr. MILLER. We have not got through with detailing our work yet. We built a short line of railroad from the beach up into the town in order to move the materials from the landing-place, about 2 miles of road, and we have made completed surveys for a line of railroad from Greytown to what we call the divide or the rock cut where the locks are to be laid, and the rise is made which brings the canal up to the level of the lake. Seventeen miles of surveys of that road are entirely completed and it is now in process of construction.

Q. I thought Mr. Menocal said the distance was 30 miles?—A. No, the distance is 17 to the divide, and then we rise up and run through a cut or basin like to the Ochoa dam, which is thirty miles.

Q. There you have reached the level of the lake which the dam will produce?—A. We reach the level of the lake then. We reach it at the third lock. You understand we come out of the lake a distance of 65 miles down the San Juan River and at that point we leave the river entirely and cut straight across to the ocean, saving a distance of 30 or 40 miles by reason of the river becoming very sinuous and crooked

through the swampy ground. We leave the river entirely at Ochoa dam and go straight across to the sea. This railroad is now in process of construction. The construction was begun about six weeks ago, the first work, and there are now at work upon it at least five hundred men. We have shipped down steel rails, two locomotives, a large number of flat cars for completing the road, together with steam shovels and pile-drivers and all the necessary machinery for the completion of this road, which is to be finished early in the fall. The necessity of this road will be seen from the condition of the country. It is impossible to move any machinery or any supplies of any quantity over this low marshy ground or lagoons in any other way. It is an absolute necessity that we should build the railroad and we build this first piece of railroad 17 miles until we strike what is called the great rock cut, or divide, which is the heaviest single piece of work on the entire line of the canal, and we build the railroad to attack that first. It will take one or two years to do that. Then the rest of the work we cut at as soon as possible, when everything that is necessary for this great cut can be easily moved from the sea into the interior.

Q. What sort of a country does that cross?—A. The first 10 miles entirely level, largely swamps, and the rest only a very few feet above the level of the sea.

Q. Where do you get your material for making your embankment or whatever you call it?—A. We get it on the sides of the road itself. The swamps are quite dry now at the end of the season and dirt is thrown up and what is not got that way is to be taken from the sea-shore by trains, for which purpose we send down cars.

Q. That is sea-sand?—A. Sea-sand taken right from the mouth of of the canal. We get a large part of it right out of the mouth of the canal, so that while we are building the railroad we are excavating the canal at the same time. When we reach this rock cut at the end of 17 miles we shall begin to take rock out and take it down to Greytown to complete this breakwater, or pier as we call it. A very large amount of the rock from the cut will be used. (The rock cut is marked *a* on the map with red pencil.) In addition to the work on this railroad the company began early to build a telegraph line from Greytown up to Castillo to meet the Government telegraph.

Q. Where is Castillo?—A. It is 24 miles below the lake on the river San Juan. The company constructed about 75 miles of telegraph line and has it in operation, connecting Greytown with the Nicaragua Government telegraph, which comes down to Castillo; so that we are in telegraphic communication with our headquarters at Greytown all the time by this line, which it is of course very important that we should have.

Q. Is there anything else that you have not already stated in regard to the actual operations that you have already carried on there?—A. Nothing perhaps of very much importance in the way of work that has been done.

By Senator PAYNE:

Q. Have you stated how many men there are in your employ?—A. We have now nearly if not quite a thousand men employed on the pier and upon the clearing and upon the line of the canal and upon the railroad, and are constantly sending more in from Jamaica. We are shipping down large quantities of railroad material and machinery.

By Senator EDMUNDS:

Q. Supposing you have a thousand men now employed, how many of

those are Americans, for instance?—A. Probably not more than two hundred—one hundred to two hundred and fifty of those are Americans. The entire engineering officers and all the skilled laborers, foremen, stationery engineers, locomotive engineers, and men that work on the pier and the pile driving—all the skilled work is in the hands of American citizens whom we have sent from New York.

Q. Out of all these during the time you have now been operating, as I understand you, there has been no serious climatic disease to make it extra dangerous for a person from the United States to go there?—A. That is correct; there has been no serious sickness of any kind and no deaths among any of that force.

Q. Where do you get the rest of your labor, the men who merely pull and dig?—A. We get some native Nicaraguans, but we get the bulk of them from Jamaica—Jamaica negroes—and some come from the West India Islands, etc.

Q. Now take the native Nicaraguan, what sort of people are they as laborers in respect of intelligence, capacity, and so on?

Mr. MENOCAL. They are a very good class of men, very industrious, and preferable to any other class of laborers that I have been able to obtain.

Q. They are real hardy, effective laborers, are they?—A. Yes, excellent men.

Q. Are they willing to work?—A. Yes.

Q. What do you pay for labor down there?—A. We are now paying about $15 a month, American money, or 20 soles, and feed and board the laborers. Of course we give them their board and quarters.

Q. Now, Mr. Miller, if you have finished the general statement about the present situation——

Mr. MILLER. I might just add one more thing in regard to that. We found on the San Juan River a steam navigation company which had chartered rights from Nicaragua, and as they had the exclusive right of navigating the river with steam and the lake also, we found it necessary to become the owners of that line in order that we might prosecute our work and use it; and under the concession we had a right to do that, and we took in this entire steam-ship line, with its vessels and everything connected with it, and are now carrying it on. We use it, of course, as a means for delivering our goods and carrying our supplies up the river and up the lake.

Q. What was the name of that line before you took it?

A. The Nicaragua Mail Steam Navigation Company.

Q. Who were the people? Were they people living there?

Mr. MENOCAL. Mr. Pellas.

Q. When was this concession made to the steam-ship line?—A. The concession was made—I know it was renewed in 1877 or 1878. It had been made before to an American by the name of Hollenback and he afterwards sold it to Mr. Pellas, an Italian, who became interested in this navigation company and bought it, then the concession that Mr. Hollenback held lapsed in 1877 or 1878 and a new concession was granted to Mr. Pellas.

Q. Direct?—A. Direct.

Q. Was that an exclusive concession?

Mr. MILLER. The exclusive privilege of navigation by steam on the lake and river.

Q. Have you within reach that you could give us a copy of that Nicaraguan concession?—A. I have not any copy here. I have one in New York.

Q. Is it in print, so that you could send us a copy without serious inconvenience?—A. Of the navigation company?

Q. No; I mean this navigation company that you bought out.—A It may be in print, but if it is in print it is in Spanish.

Q. I do not care about that. I wish you would send us a copy.—A. Yes, I will.

Q. Now, you had to take this company in order to execute the mis sion you had in hand?—A. Yes.

Q. Now, are you willing to tell us, in the confidence of this committee and running the risk of its getting out, how much you had to give for that?—A. Three hundred thousand dollars.

Q. Was that the maritime canal company chartered by Congress or your construction company?—A. Our construction company. We had to buy it before we could do anything.

Q. So that has become a part of your plant?—A. A part of our plant.

Q. And when your contract with the Congressional canal company is executed you get back your $300,000?—A. The company will undoubtedly have to go out of existence then, as the railroad will be completed and the canal will be completed and there will be no use for it.

Q. Yes, but if it is an exclusive privilege, and your construction company now owns it, suppose the canal were finished to-day, then the question is, you, a different company from the Congressional company, are the proprietors of the exclusive privilege of navigating Lake Nicaragua by steam?—A. Yes.

Q. Now what is going to happen?

Mr. MENOCAL. This exclusive privilege is only for the internal commerce of Nicaragua.

Q. Purely internal commerce?—A. Yes, the rights of the interoceanic canal are reserved by Nicaragua.

Q. So that, notwithstanding this exclusive grant for local traffic, the right of the Congressional company to transfer vessels from the Atlantic to the Pacific, and *vice versa*, would not infringe upon that grant?—A. Not at all.

Q. Very well, now I understand.

Mr. MILLER. As to our present work, we are sending forward to Nicaragua a large amount of railroad material, and also a complete machine shop capable of building machinery or of repairing it; also a furnace for making cast-iron, as there is no foundry in the republic at all. There is no way of getting a piece of iron without sending up to New York for it, and we need a large amount for the completion of the pier and material for the completion of the railroad. In fact we have three vessels now on the way loaded with material and two more under chater loaded with coal and railroad iron, everything that is necessary to carry on this work to complete what I have said, the dredging of the harbor and building the railroad, the dredging of the harbor being of the first importance, as we want to get in, and the building of the railroad in order to get into the interior.

Q. And cut off the forest, as I understand you?—A. The two important things which the company found were first, to open the harbor, and second, to build a line of railroad 17 miles in until we struck hard ground or rock. That work is being pushed with great vigor. That is to be finished by early fall. That is substantially the condition of the work.

Q. How much money has been spent altogether there now in round

numbers?—A. In round numbers from the beginning I suppose about $3,000,000.

Q. That includes the $300,000 paid to this local transportation company?—A. No, not including that; outside of that.

Q. Well, is there money in hand in one company or the other to complete the things that you have already described as in progress?—A. There is money enough in hand or in sight that is subscribed that will come in in the regular order.

Q. That is, available assets?—A. Yes, sir, available assets that will complete all the work we have contracted for. I started out with the proposition that we would make no contracts for work beyond what we could see our way clear to pay for. The construction company, I will say, has already taken means to bring into its treasury a million and a half more of money, which will come in unquestionably within the next few months, so that when these two works are completed that we are now at we will go on to the western end of the canal and lay out the work the same way there. All the work that has been done so far in the way of establishing headquarters, houses, shops, and hospitals has been laid out on a scale calculated to be sufficient for the prosecution of the whole work whenever we shall have the money in hand to do it. We think we have not wasted any money at all, and have not done anything in a little or petty way. We have started to lay out the work so that when we are in a condition to push it along the whole line our organization will be as complete as that of any army and we can carry it on systematically and thoroughly, protecting all the rights of the company and protecting ourselves against frauds of all kinds. We have a complete police system which I have not mentioned, which we have a right to under the concession. We have to maintain a police force with these various nationalities in order to preserve the peace and take care of our property. In short, the work, I think, has been laid out in the beginning in such a way as to make every dollar count and to put the work in such a condition to push it to a completion at the earliest possible moment whenever the financial arrangement has been made or money sufficient to do the work.

Q. So that, so far as you have gone, every step that has been taken and all the money that has been expended has been a direct and economical means to the end of actually constructing that canal?—A. That is my judgment about it. It has been done economically, and, so far as we have gone, it has been done below our own estimates for the same work.

Q. Are you willing to furnish the committee with a copy of the contract between your construction company and the Maritime Canal Company, so that the committee may know what are the relations and reciprocal duties and obligations of the two companies?—A. I should prefer to consult the board of directors in regard to that. I can say, generally, this in regard to it. We have undertaken to construct a canal for the securities of the company which may be issued against it. Some points of that contract are still left open because it has been impossible to determine exactly how much money would be required until we knew more of our own financial schemes, so that we could determine more fully what the securities would bring in the public market; in short, that the Maritime Company should undertake to issue securities enough, which, when sold in the market, would bring money enough to complete the canal. And, whilst the question of financing the whole thing has been going on, the amount that should be issued or the inter-

est that the bonds should bear has been left open for further negotiation.

Q. Are you a director in the Maritime Canal Company?—A. I am not.

Q. You have no connection with that?—A. No connection with it at all.

Q. How much is the capital stock of your construction company, the Colorado corporation?—A. Twelve million dollars.

Q. How much has been actually paid in; what percentage of that $12,000,000 stock has been subscribed?—A. Well, some of that stock was issued to the original association for the work they did in procuring the concession and the moneys which they paid out for the preliminary surveys, which extended over two years of time. Just how much there was of that I am not able to say without going back to the books. The stock of late, $4,000,000 of it, was issued at 50 cents on the dollar, money actually paid in on it, and more of it, one and a half millions, we expect to issue substantially at par.

Q. How much is now actually outstanding; how many shares of the $12,000,000?—A. I think about ten and a half millions is out.

Q. Representing paid-up stock?—A. Yes.

Q. The Maritime Canal Company you know, by the act of Congress, is required to report once a year to the Secretary of the Interior a full account of all its transactions, so that if it made a full report this contract between itself and your railroad company would appear, and therefore I should suppose it would be proper for us to ask you, and for you to respond, although you do not happen to be a member of that very company, to let us have a copy of the contracts which shows the relations between the Congressional corporation and the Colorado one.—A. Well, I do not think there will be any objection to that, although, as I say, that contract has not been fully completed. It was not at the time of that report.

Q. The sixth section of the act incorporating the Maritime Canal Company of the 28th of February, 1890, provides:

SEC. 6. Said company shall make a report on the first Monday of December in each year to the Secretary of the Interior, which shall be duly verified on oath by the president and secretary thereof, giving such detailed statement of its affairs, and of its assets and liabilities, as may be required by the Secretary of the Interior, and any willfully false statement so made shall be deemed perjury and punishable as such. And it shall be the duty of the Secretary of the Interior to require such annual statement and to prescribe the form thereof and the particulars to be given thereby.

A. That report was made, but the contract was not fully completed at that time, and in fact it is not fully completed yet, because, as I say, it was left open substantially because on certain conditions we should have to have more securities to build the canal than we should on other conditions.

Q. Now, Mr. Miller, I wish you would tell us about the prospects and plans for raising money and the methods that you yourself can consider as being feasible and how much and all about the future of the finances, how you are to get the money and on how much discount and how much the real cost of the thing is to be and how much in any way you can negotiate securities for, and what will be the outstanding obligations as distinguished from actual money to be paid out for all expenses.—A. The estimate of our chief engineer, Mr. Menocal, is that the actual cost of building the canal, outside of any interest or commissions or anything of that kind, will be in round numbers $65,000,000. His report and estimates are here presented. When Mr. Menocal's surveys

were completed they were submitted to a board of consulting engineers consisting of five engineers of distinguished ability and character. They went carefully over the estimates of Mr. Menocal, and their report, which is herewith presented, makes an estimate of the total cost in round numbers of $73,000,000, and then they say that, to cover all pos sible contingencies of construction, they add 20 per cent., which amounts in round numbers to $14,000,000. That makes their grand total estimate in round numbers $87,000,000. As to the correctness of Mr. Menocal's estimate I can say this: Several very skillful contractors, men who have had large experience in building public works, especially railroads in the West, have been over the line of the canal and given a great deal of time to the consideration of the plan and details upon the ground itself, seeing what obstacles they had to overcome and what difficulties there were in the way. One of those contractors, after having made three several visits to Nicaragua, said to me that he would put in a bid for the entire western division of the canal, that is from Lake Nicaragua to the Pacific Ocean, including the harbor at Brito and the three locks on the western side, which bid would be less than our own estimates. I only mention that to give you an idea as to whether the estimates are correct or not. Of course unforeseen difficulties may arise and the cost may be increased, but the company, after these two years of examination and consideration, believe that the cost of the canal can never under any circumstances exceed $100,000,000.

By Mr. PAYNE:

Q. That embraces his estimate for the extras?—A. Yes. Now as to the method of raising this amount of money, of course it can only be done by selling the securities of the company. They consist, or will consist, of stock and bonds. Since I have been president of the Construction Company I have consulted with many leading financial men in the country, and of course it is impossible to say at this time at what price bonds of the company could be negotiated, but I am frank to say that I do not believe that they can be negotiated at par or very near it. This is a peculiar enterprise, which presents many obstacles, and of course it will be looked upon by the investing world as somewhat problematical. The first bonds of the Suez Canal, I believe, netted the company only about 60 cents on the dollar. How much more than that we shall be able to obtain for our bonds I am unable to say, but I have no doubt but what the bonds can be negotiated in the markets of the world at a price much above that of the first Suez bonds.

The present intention of the company is to make arrangements with what would be called a syndicate of bankers, getting one large and reputable banking house to take the lead in the matter, and that house to associate with itself a large number of banking houses in this country and in London and in Amsterdam and in Frankfort and in Berlin—houses which are now in the habit of associating themselves together for the placing of large loans or the placing of a large amount of securities—and expect to make a contract with the leading house, the head of the syndicate, to take these securities and market them as best they can, so as to give us somewheres in the neighborhood, we will say, of ten to fifteen millions of money per annum as the work shall go on.

Banking houses are ready to undertake this work, and the only question about it is a question of commissions and the question as to what price the bonds shall go to the public at in order to induce them to take

them. We can not expect the public will come in and take these bonds unless they are offered to them at such a price as to give them a large profit in case the work succeeds. This project is entirely different from the project of building a railroad and issuing bonds upon it as it is constructed.

The interest on money used upon the construction is a proper charge of the cost of construction as much as the money that goes into iron or into labor or anything else. People who put their money into an enterprise expect the interest will be charged against construction until the work is completed, so that we have to provide not only for the cost of the work as it goes on, but we must provide for the interest on the bonds until such time as the canal is finished and begins to earn.

We assume that it will take six years to build this canal from the time we have money enough to push it with vigor; that is to say, if we were to have our negotiations completed for the placing of our bonds at the end of this year and could begin to get our money at the next year we should count it would take six years from next January to complete it. If a bond is issued I presume it can not be floated at less than 5 per cent. interest. If we were six years in building the canal there would be three years' interest to pay upon the entire issue of bonds, whatever that might be, and how large that issue will have to be is, of course, dependent upon the price we may obtain for the bonds. The company has hoped that it would get such a price for the bonds as would enable us to pay this interest and pay the cost of construction and give a fair profit to those connected with the enterprise by the issuing of not more than $150,000,000. Whether that can be done or not I can not say at this time, but I feel very confident that bonds of the company can be marketed, and at such a price as will enable us to complete the canal.

Q. What allowance do you make for the stock?—A. We have not as yet made any calculation upon the stock, holding it in reserve and not issuing it at all unless it should be found necessary. Of course the bonds will go on the markets of the world and they will go wherever the money comes from. This, in short and substantially, is the plan of the company if it is left to itself.

By Senator EDMUNDS:

Q. Is that the plan of the Construction Company or of the canal company?—A. That is the plan of the Construction Company. The Construction Company takes these bonds and agrees to negotiate them.

Q. They are to be the bonds of the canal company?—A. They are to be the bonds of the canal company entirely.

Q. And you are to float them the best way you can?—A. Yes.

Q. I understand you to say that Mr. Menocal's estimate is $65,000,000?—A. In round numbers, yes; and the board of consulting engineers went over his figures, taking the same points, and made it $73,000,000, and then they said, "to cover all possible contingencies we think it wise to add 20 per cent. to that."

Q. That would make $87,000,000 in round numbers.—A. Yes.

Q. Now, I understand you to say that on the credit system of putting off bonds or stock, or whatever way of doing it, the thing would stand in as a capital or loan on which interest or dividends have to be paid out of the income of the concern when done, would be up toward $150,000,000?—A. My judgment is that to get that amount of money

we should have to issue at least $150,000,000 of bonds at 5 per cent. interest.

Q. But a positive obligation then, when the thing is done on the credit system by raising a loan, would be in round numbers $150,000,000?—A. Yes.

Q. On which interest and finally principal would have to be paid, for an actual expenditure with the 20 per cent. for unforeseen contingencies, of $87,000,000?—A. Yes, but in addition to that you must add interest on the bonds during the process of construction. The interest accruing during the process of construction is as legitimate a charge upon the construction as the building of a lock.

Q. Yes, but it is only interest upon the money that is used that year. So it is not an interest on the $87,000,000. It takes six years to build it. It is an interest on $14,000,000 or $15,000,000 annually?—A. No, it would be the interest upon the entire sum. We will suppose it takes six years to build the canal, and during the six years we issue $150,000,000 bonds, in equal proportions each year, distributed over the six years. Then it would be three years' interest upon the whole amount. It would be an average of three years.

Q. At 5 per cent.—that is 15 per cent. on $150,000,000?—A. That would be $7,500,000 interest for a year on $150,000,000 at 5 per cent., and three years is $22,500,000 interest. That is a proper charge, as much as engineering work is a charge. That is the way all financial operations are carried on.

Q. But then, after all, if your stock in the Maritime Canal Company for this practical purpose—it does not make any difference which we call it—is taken up to the extent of $87,000,000, the utmost estimate, and allowing 20 per cent. for anything the experts can think of on this $87,000,000, you are going to pay interest for the three years on $150,000,000, and in the end you have got the $150,000,000 to pay. That is the difference between the cash system of positive money and borrowing, is it not?—A. That is it exactly.

Q. Very well; that is just what I want to find out. Now tell us, in a general and condensed way, what the outlook is for business, and what you know in respect of the business of the Suez Canal, which is the only thing which can be compared with it?—A. If $150,000,000 of bonds are issued for the building of this canal the fixed charge upon the revenues of the canal for interest will be $7,500,000 per annum. It is assumed that the canal can be maintained and operated for $1,000,000 a year. The cost would be $8,500,000 per annum for the fixed charges of the canal when completed.

Q. Then you would have to add to that, of course, the salaries and other things, unless they are included?—A. No, they are included in the $1,000,000; that includes the maintenance; that would be officers and every repair that might be made.

Q. And all the incidental and all expenses are included in $1,000,000?—A. Are included in $1,000,000. As to the earning capacity of the canal the only precedent we have is that of the Suez Canal, which began operations in 1879, and the receipts of the Suez Canal for 1888 were $12,975,000.

Q. What year did that canal begin its operations.—A. It began in 1879.

Q. Have you got a table that will show it wholly from year to year?—A. I have got it each year.

Q. I wish you would state it. It will be very interesting to come in there.—A. I do not know whether the first year is a full year or not. In 1879 the receipts were $5,595,000; in 1880, $7,501,000, which of course was a full year; in 1881, $9,619,000; in 1882, $11,346,000; in 1883, $12,350,000; in 1884, $12,029,000; in 1885, $12,422,000; in 1886, $11,297,000; in 1887, $11,565,000; in 1888, $12,975,000. For the year 1889 we have not the report as yet.

By Senator PAYNE:

Q. Now what was the cost of that? Have you got it there?—A. Between $98,000,000 and $100,000,000 in round numbers.

By Senator DOLPH:

Q. Have you got anything to show the charges, the rates of toll, and the actual tonnage of the canal—for instance in 1888?

By Senator EDMUNDS:

Q. The tonnage, the expense account, and all that, so as to show the net there?—A. I do not know whether it is all printed here or not. I have got it at home. It will be noticed here that the income fell off a little between and to 1886, and at that time there was a reduction made in the rate of tolls. The rate of tolls was reduced. Then in 1888 they recovered to its highest point. The toll now is $1.80 per ton.

Q. Is that per ton of measurement or per ton of cargo; probably the registered ton?—A. Yes. The tolls at Suez at the beginning were $2.50 per ton, and then reduced to $1.80.

Q. Have you got a table there which shows an increase of tonnage, if there was any, following the reduction of tolls?—A. I have the number of ships and the net tonnage. The first year, 1879, it was 2,263,000 tons; the next year it was 3,057,000; the next year it was 4,136,000; the next year, 1882, it was 5,074,000; in 1883 it was 5,775,000; in 1884 it was 5,871,000; in 1885 it was 6,335,000; in 1886 it was 5,767,000.

Q. That was the year of the Egyptian war?—A. Yes. In 1887 it was 5,903,000; in 1888 it was 6,640,000.

Q. Have you the expenses of operation?

By Senator DOLPH:

Q. Have you the number of vessels?—A. I have the number of vessels. In 1879 the number of vessels was 1,477; in 1880, 2,226; in 1881, 2,727; in 1882, 3,198; in 1883, 3,307; in 1884, 3,284; in 1885, 3,634; in 1886, 3,100; in 1887, 3,137; in 1888, 3,440. The vessels have increased in size and are fewer there, you see.

By Senator EDMUNDS:

Q. Now how does the expense account run?—A. The expense account I have here only for one year; that is for 1888. For administration—that means for the officers, $207,914; for operation, $521,137; for maintenance and renewals, $378,007; making a total of $1,207,058 as against a gross income of $12,975,315.

Q. Leaving a balance of apparent net of how much?—A. The net receipts, $11,678,257, for the year 1888.

By Senator PAYNE:

Q. Now according to your judgment, Mr. Miller, how would the business of this canal compare with that of your canal?

Senator DOLPH. If you will excuse me for a moment, does that item for operation include the expense of towage; are they sail vessels that navigate the canal?

Senator EDMUNDS. There are very few, but there are some. I suppose there is an additional charge for towing?

Mr. MILLER. Certainly. A sail vessel going through there would have to pay for its towage just as it does in a harbor elsewhere.

By Senator EDMUNDS:

Q. Now give us your calculation as to what the Nicaragua Canal would have to do and the business it would accomplish?—A. The first estimate made of what the probable business of the canal would be was made at the Paris conference in 1879, which De Lesseps called for the consideration of this question. At that conference I believe the tonnage then estimated that would pass through that canal was 5,000,000 tons.

Q. That is the Panama Canal?—A. I think their estimate, taking the commerce of the world, that would be tributary to the canal—that was estimated at the beginning would be about 5,000,000 tons per annum. The exact figures I have not here, but I can get them and send them to you.

Q. I wish you would. Do you know what the comparative distance is between London and Paris and Havre, all that region of Great Britain, Liverpool, London, Bristol, Havre, Gibraltar, and all the British Channel ports to Japan and China going by Suez compared to the distance going by the Nicaragua Canal when it is done and perfectly complete to carry ships that wish to go?—A. Well, I have got all of that. I referred to it generally. I have right here the estimate of what the business of the Panama Canal would be in 1879. It amounted to 4,570,000 tons, and it is made up of the trade that was then known to exist, the trade that was then going around the Horn and would naturally go by this route if open, and in this document, which I will leave, is given the nationality of the trade—where it would go. In 1879 it was estimated at 4,570,000 tons, and taking this percentage of increase previous to that time and giving the percentage now, it is estimated at the present time the trade that would seek this line is, in round numbers, 7,000,000 tons per annum.

By Senator DOLPH:

Q. A large proportion of that must be sailing vessels.—A. That is very largely sailing vessels now, undoubtedly, but undoubtedly it would very rapidly change into steam vessels when the canal was completed.

Q. Have you a statement of our commerce upon the Pacific coast estimated from the number of ships or tonnage?—A. Not since 1879, but I can get it and send it to you.

Q. Oh, it is not material. I do not care about it.—A. It is believed that the business will largely increase between the west coast of the United States and the Atlantic coast; that a very large growth of business will take place from Puget Sound, which is to-day the greatest lumber region of the world, and that the lumber from Puget Sound which does not go into the Atlantic Ocean at all will find an immense trade the moment it is open. Now it goes to the west instead, to China and Japan, and it is said they have the largest forests in the world from which the world must draw its supplies. What that growth of commerce will be it is impossible to accurately estimate. The people

upon the Pacific coast and in California and in Puget Sound believe that in five years the trade will more than double.

By Senator EDMUNDS:

Q. What rate of tonnage do you think that kind of commerce, of the cheapest and most bulky materials like lumber, etc., could bear for the advantage of going through the Nicaragua Canal? By tonnage I mean tolls, of course.—A. Well, the concession from Nicaragua allows the canal company a maximum of charge of $2.50 per ton, the same as the Suez Canal in the start had. Between New York and the Pacific coast the saving by this route between New York and San Francisco is, in round numbers, 10,000 miles.

By Senator DOLPH:

Q. Two dollars and fifty cents per ton on a thousand-ton ship would be $2,500 toll?—A. Yes.

Q. What would be the probable cost of towage of a sailing vessel?—A. Well, it is estimated a vessel will pass through the canal in twenty-four to thirty hours. A sailing vessel will be towed by a good vessel—one tug would take two in probably about thirty hours.

Q. Could they navigate at night?—A. Oh, yes; of course. The larger part of the distance is in the open water, in the lake and in the river, and of course that will all be lighted perfectly so that it can be navigated in the night as well as in the day. The ordinary cost of chartering a tugboat of that kind in New York Harbor, one large enough to do that, would be not to exceed $40 a day.

By Senator PAYNE:

Q. What is the length of the Suez Canal?—A. Ninety-eight miles.

Q. And yours is how much?—A. The entire distance across Nicaragua is 170 miles, but there are only 27 miles of it canal; the rest of it is river and lake navigation—that is, open navigation through which you can go at fair speed, and vessels can pass each other.

By Senator EDMUNDS:

Q. Well, $2,500 for 1,000 tons, carrying lumber for instance from Puget Sound to New York, how many thousand feet, board measure, of lumber would a thousand-ton vessel carry?—A. I could not give you the figures without going to the books to see what the weight is, but we are chartering vessels all the while to carry lumber, building our shops and our pier, and they carry from 350,000 to 500,000 feet, board measure, and we are paying about $5,000 freight from New York to Greytown, a distance of 2,000 miles, for sailing vessels.

Q. You pay $5,000 for carrying 350,000 feet of lumber?—A. Yes.

Q. What is the tonnage of vessels carrying 350,000?—A. About 600 tons. And that is not an excessive freight at all. That freight is very close. That is the cost of the freight. Now, if you were to send that vessel around the Horn—the distance from New York to Greytown is only 2,000 miles——

Q. Yes, but the thing I want to get at is this: Take Puget Sound lumber, which I will assume laid on board a vessel of 1,000 tons at Seattle and contains 500,000 feet is at a cost of $10,000. Now, then, the question is, how much that 500,000 feet of lumber has got to pay to get through that canal per thousand feet; how much the cost to whoever owns it would be enhanced to the people who could buy and sell it, so as to see

whether the lumber trade of Puget Sound could stand a tax of that amount of money—$2,500 on 500,000 feet of lumber—to go through that canal? That is what I want to get at, because you say you expect this to be a part of your expected traffic.—A. Well, you misunderstood me there. That is no part of our estimated traffic. The traffic we have estimated on is a traffic we know to exist. That is simply prospective. It is no part of the estimate that was made in 1879 of the traffic that would go through the Panama Canal, and it is no part of the 7,000,000 tons we have estimated to now exist, because that traffic does not exist. We simply speak of that as a prospective growth of trade.

Q. And the traffic you have already calculated on is the traffic with China, Siam, etc., composed of silks and spices and coffee and tea and so on?—A. No; that does not go around Cape Horn, and therefore we have not estimated it.

Q. Exactly what I want to get at is whether the lumber trade of Puget Sound could stand a tonnage of $2.50 a ton for 500,000 feet of lumber; whether it could go through and still find a market?—A. I understand your question, and I think I had better not endeavor to make any arithmetic answer to it here, but I will take that problem home and have it worked out.

Q. Well, just take hold of it and have it worked out.—A. Yes, I understand just exactly what it is. As a partial answer I simply referred you to what it cost to send a vessel of 600 tons from New York to Greytown carrying 350,000, board measure, at a freight of $5,000. I simply threw that out as a statement. I will have the computation made showing exactly the difference between sailing around the Horn or coming across as to the amount that would be spent in freight, and I will also take up the question of moving wheat from California to Liverpool that now goes around the Horn. I will have those figured out accurately and send them over to you, so that it can go with this statement.

Q. Is there anything else you think of to state?—A. I do not know as there is. I am willing to answer any questions.

Q. One other question Mr. Evarts has suggested. In your looking forward to raising the means to carry on this enterprise, where do you and your friends expect that this money is to come from; from citizens of the United States or from citizens of other countries?—A. We expect it will come from the whole world if we put out our bonds, and my judgment is that the bulk of the money will come from abroad, where all of our great enterprises go. Our people are very much interested in this whole question. I can say that, being at the head, the president of the company, we are getting a great many inquiries from all over the United States in regard to the undertaking, and the whole newspaper press of the country has taken it up and shown great interest in it; but we are getting to hear a great many inquiries from financial people in Europe. They are coming direct and sometimes coming through their agents in New York, who are constantly coming to us for information as to this enterprise, as to what it proposes to do and what its financial plan is.

By Senator PAYNE:

Q. Practically you will have to negotiate with a large house in New York or London and they will coöperate in forming a grand syndicate.

By Senator EDMUNDS:

Q. Yes, but suppose that at the end of ten years from to-day the canal is done and $150,000,000 are out to have accomplished it, where do you think, from your knowledge of all these transactions and the ways of human affairs, these bonds when the thing is done at the end of this ten years will be? Will they be held chiefly by the people of the United States or chiefly by the people of some other countries?—A. I think at least two-thirds of them will be in Europe.

Q. Have you described on what length of time you expect these bonds to be put out?—A. I have said nothing about that, and that is one of the questions between the two companies that is still open—that has not been decided—what the length of the bonds should be.

Q. Well, what do you think yourself?—A. I think it will not be less than fifty years and it may be even longer than that. I do not know whether the proposition has been much discussed of making them ninety-nine years or not.

STATEMENT OF CHIEF ENGINEER A. G. MENOCAL.

By Senator EDMUNDS:

Q. What is your present relation to the maritime canal across the Isthmus of Panama?—A. I am chief engineer of the Nicaragua Canal Construction Company.

Q. Have you been connected with the previous surveys of the Isthmus?—A. I have been connected with all the surveys that have been made in Nicaragua since 1872.

Q. Will you explain to us, in a brief and condensed way in view of what Mr. Miller has already said, what the present state of your operations there is, what you have actually done in respect of final location and work upon that final location, and the prospective work that is to be done, so that we can see at a glance, in view of these maps that have been presented, just how far you have got on?—A. The proposed Nicaragua Canal is the result of many years of explorations and surveys conducted under the auspices of the United States Government and of private parties, and of exhaustive surveys made by a numerous and well organized corps of competent engineers of the Nicaragua Canal Construction Company, from December, 1887, to the present date, for the final location of the route and careful examinations and studies of all the work required for the completion of the canal from the Atlantic to the Pacific. No problem has been left unsolved, and all doubtful elements may be regarded as eliminated.

The canal as finally located lies in the lowest depression of land in the Cordilleras, between the Arctic Ocean and Cape Horn, and traverses a salubrious and fertile country, rich in natural resources and capable of great development. Lake Nicaragua, a large inland sea of fresh water, and its outlet, the river San Juan, occupy a large area of this depression. The surface of the lake is 110 feet above the sea-level and its western border is less than 12 miles from the Pacific coast, from which it is separated by a low divide of 42 feet above the lake-level. The lake is 100 miles in length, has an average width of about 45 miles, and a variable depth, reaching in some places 165 feet.

The proposed canal extends from the harbor of San Juan del Norte (Greytown) on the Caribbean Sea to Brito on the Pacific. The total distance from ocean to ocean by sailing line through canal and lake is 169.45 miles, of which but 26.78 miles will be wholly in excavation, the other 142.67 miles being through Lake Nicaragua, the San Juan River, and artificial basins. Of the latter distance, 102 miles will have a depth of 30 feet or more, requiring neither dredging nor excavation.

The lake is the main feeder and the summit level of the canal. It is connected with the Pacific Ocean by 11.40 miles of canal in excavation

and 5.27 miles of artificial basin created in the valley of Tola by the construction of a dam across a narrow gorge of the valley, 3 miles distant from the Pacific coast.

From the lake eastwards the canal follows the river San Juan for a distance of 64½ miles to Ochoa, where by the construction of a dam across the river the surface of the water is raised 55 feet and slack-water navigation secured along that distance, converting that portion of the river into an extension of the lake. Just above the dam the canal leaves the bed of the river and enters into a chain of artificial basins formed by the construction of a series of dams and embankments and short cuts, confining and connecting adjacent valleys for a distance of about 12 miles to the western end of the great divide cut. The heaviest work in the whole line is now encountered in crossing the divide separating the valleys of the San Francisco and Deseado Creeks, where nearly 11,000,000 of cubic yards of rock and earth excavation are concentrated in a distance of 2¾ miles. However, the rock is hard and homogeneous, there are ample natural facilities for doing the work; the rock is needed for the construction of breakwaters, locks, dams, embankments, etc., and if not found in that favorable center of distribution it would have to be quarried at other places.

Easterly of the divide cut there is another artificial basin about 5 miles long formed by the construction of a dam across the valley of the Deseado, and thence 12 miles of canal in excavation extending to the harbor of Greytown, of which nearly 10 miles will be at the level of the sea.

The summit level of the canal extends from the western end of the basin of Tola to the eastern end of the Deseado basin, a distance of 154 miles. It has been stated that this upper level is 110 feet above the sea-level. This elevation is proposed to be overcome by six locks, three on the Atlantic and three on the Pacific slopes—the lifts of these locks varying from a maximum of 45 feet to a minimum of 25 feet, their uniform length being 650 feet and the width 80 feet.

The harbors of Greytown and Brito need to be enlarged and improved by the construction of breakwaters and by dredging, but the works required present no serious engineering difficulties.

With the exception of the rock cuts in the eastern and western divides, the canal prism will be at all points wide enough for two ships to travel in opposite directions, and its least depth will be 30 feet. In the lake, the river San Juan, and the artificial basins vessels can travel with entire freedom.

The computed quantities of excavations, embankments, and fills, as determined by a careful location of the entire route, study of all accessory works, and borings to the depth of necessary cuttings, are as follows:

	Cubic yards.
Dredging below sea-level	29,823,161
Earth excavation above sea-level	21,773,810
Rock excavation	13,452,938
Rock excavation under water	575,445
Total excavation, earth and rock	65,625,354
Rock fills for dams and breakwaters	4,033,810
Earth fills	6,105,380
Stone pitching	202,641
Concrete in locks and retaining-walls	615,651

It is estimated that the canal can be completed in seven years, of which one year will be consumed in preliminary work.

The estimated cost of construction of the whole canal and the two

harbors is $65,000,000. This estimate has been revised by a board of consulting engineers, who, after allowing a large percentage for possible and remote contingencies, have fixed the total cost of the work at $87,000,000, exclusive of commissions, banking, and interest during the time of construction.

The capacity of the canal for traffic is estimated at 32 vessels per day, or 11,680 in one year; which, based on the average tonnage of vessels passing through the Suez Canal, will give an annual capacity for traffic of over 20,000,000 tons. By passing more than one vessel in each lockage, the above estimated capacity may be largely increased. The present traffic of the Suez Canal is about 3,500 vessels, with a tonnage of about 7,000,000 tons annually.

The water required for thirty-two lockages in one day is 127,400,000 cubic feet, while the lowest flow of the lake in the dry season is 11,930 cubic feet per second, or in one day 1,272,530,600 cubic feet; consequently the lake supply alone is ten times the maximum needed for the operations of the canal.

The time consumed in passing from ocean to ocean by steamer is estimated at twenty-eight hours, which includes one hour and twenty minutes for possible detention in narrow, rocky cuts.

The business of the canal at the time of its proposed completion in 1897, based on reliable statistic information, is estimated at 7,000,000, of which more than half will be between ports of the United States, or the United States and other countries; but the natural growth and development of the Pacific States and Territories, greatly promoted and materially increased by the opening of the canal, will add millions of tons of traffic to the canal which present information fails to show.

WORK ACCOMPLISHED.

From December 1887 to June 1890, the Nicarauga Canal Construction Company had a numerous corps of engineers constantly employed exploring all possible routes, and making a careful survey of the one finally selected as possessing the greatest facilities, with the least doubtful problems, for the construction of the canal. More than $300,000 were expended in these surveys.

The first expedition for construction left New York on the 25th of May, 1889, and on the 3d of June landed at the proposed entrance to the canal from the Caribbean Sea, near Greytown, on a sandy uninhabited coast, without harbor or shelter from the elements, with no means of communication along the line of the canal except through tortuous and much obstructed streams, some of which could not float a loaded canoe, and depending altogether on a base of supplies for materials for construction and subsistence 2,000 miles distant, with only one line of steamers touching on that coast, and two weeks distant from the nearest telegraph station.

The first work of the pioneers of the great enterprise was necessarily one of self preservation. Rude temporary shelters had to be improvised for the protection of men and stores while more permanent buildings could be erected; means of transportation along the route of the canal through deep and extensive swamps and virgin forests had to be provided for, and telegraph communication to the nearest station, more than one hundred miles from the coast, and connecting the various camps about to be established with the base of operations, was felt from the start to be an indispensable adjunct in prosecuting the work. Under these conditions, aggravated by an insufficient supply of an in-

ferior class of labor, the first operations were difficult, tedious, and expensive, and it was not until the month of October following that the most indispensable elements for the organization of the various departments and distribution of the working forces had been created and the preliminary work of construction could be said to have commenced.

The opening of an entrance into what used to be the Bay of Greytown, now converted into a fresh-water lagoon, was recognized from the start to be an indispensable requisite in the prosecution of the work of excavating the canal. Ships now anchor about 2 miles off shore, and machinery and other supplies are brought ashore in lighters, through a shifting entrance and dangerous bar with a variable depth, never exceeding 6 feet. This method of landing supplies involves considerable risk and expense, and is altogether inadequate for the discharge of the heavy machinery required.

The company, therefore, has spared no effort in obtaining an entrance from the sea into the bay, and the construction of the breakwater required to arrest the shifting sand and protect the dredged channel was one of the first works undertaken by the company, and pushed ahead with all possible dispatch. This pier is now about 700 feet long, its outer end being in 12 feet of water, and so far has fulfilled, even beyond expectations, all that was expected to be accomplished by its construction. It affords now sufficient protection to the dredges excavating the channel, and the company has already made a contract for the excavation of the entrance and inner bay to a depth of 20 feet. Some of the dredges are on the way to Nicaragua and others are in process of construction and will soon leave for Greytown. It is expected, therefore, that within the next five months vessels drawing 15 or 20 feet may be able to enter the bay and discharge their freight directly on the wharves of the company.

Heavy machinery suitable for the work can then be safely landed, the work of preparation may be said to have been completed, and active operations can be undertaken along the whole route.

While prosecuting the harbor work the company has also established permanent quarters, erected large store-houses, hospitals, dwellings, shops, and other buildings. It has accumulated the necessary material for the construction of an aqueduct 13 miles in length (work on which is now actively pushed), which is to supply Greytown, the works on the eastern section of the canal, the harbor, and the company's headquarters with fresh water from the mountains. It has erected wharves and warehouses for the receipt and storage of supplies. Parts of the San Juanillo, Deseado, San Francisco, and other streams have been cleared of obstructions and made navigable for small crafts, and several miles of the route of the canal between the harbor and lock No. 1 have been grubbed and cleared and made ready for dredging.

The company has built about 2 miles of broad-gauge railroad and about 70 miles of telegraph and telephone lines, and has landed at Greytown large quantities of machinery, tools, lumber, piles, creosoted timber, boats, steam-tugs, and launches, lighters, pile-drivers, and other materials and equipment necessary for the harbor and canal work. Large quantities of railroad supplies, locomotives, and steam excavators are now at Greytown, and a contract has been let for the construction of 17 miles of railroad from Greytown to the eastern divide cut, work on which has already been commenced. The company has also spent large sums of money for engineering work in locating railroads and in making final plans and detailed surveys of the canal, the harbors, locks, and

other accessory works, and, in short, it may be safely said that the whole work is being pushed forward as rapidly as the circumstances and condition of the country permit.

There are now six engineering parties in the field, in addition to those engaged in the harbor and railroad construction, making detailed surveys and geological examinations of the sites of the dams and embankments and of the locks; so that the company may be able at any time to let the contract for those works simultaneously with that of excavating the canal.

The administration and medical departments as now organized and equipped are capable of rapid enlargement and efficient work, and there is every reason to believe that if the work on construction is prosecuted without interruption the canal will be opened to traffic within the six years intimated for its construction.

Q. How many years ago were you first there?—A. My first trip to Nicaragua was in March, 1872.

Q. How many times have you been there since; in how many different years?—A. 1872, '73, '74, '76, '77, '80, '85, '87, '89, and '90. That is the number of trips I have made.

Q. In all that time how many months altogether, in round numbers, have you spent there?—A. It may be estimated that I have been there no less than four and a half years' time continuously.

Q. Have you been there, taking it all things together, in all seasons of the year?—A. In all seasons of the year.

Q. How was your health affected by it?—A. It was always better. I have never been injuriously affected by the climate.

Q. What has been your observation, then, as to the Northern people and others you have employed, as to the salubrity of that climate?—A. In these expeditions in which I have been engaged, in the surveys both of the east and the west side, I have always had a large number of employés, most all Americans, with perhaps a dozen natives in each party, engaged in cutting brush and clearing the way for the engineers, and we have never lost a man, or I never had a man more than two days in camp on account of diseases contracted in the country.

Q. What do you think, then, in respect of any extraordinary danger to Northern white men in carrying on the operations of that canal?—A. I anticipate no danger whatever. So strong is this feeling that I have two of my sons there now engaged in the construction of the work.

Q. How much is the rise and fall of Lake Nicaragua in its present natural condition from extreme high water to extreme low water?—A. From $2\frac{1}{2}$ to 5 feet. We propose to retain the level of the lake at 110 feet.

Q. How much will that swell it above its lowest natural condition?—A. Six and a half feet.

Q. So that that will carry it up to a height of 2 or 3 feet above its ordinary tide-water?—A. Yes, but 110 feet is not above the highest water-mark by any means.

Q. Will it carry it up where it will kill trees, make the shores as an overflowed land that is never now covered?—A. No, sir. I would not say never, for sometimes the water reaches an elevation above 112 feet.

Q. So that your highest point of elevation artificially made will not exceed what sometimes the highest natural water is?—A. No, sir.

Mr. MILLER. I have an idea that it has been over 112 feet.

Mr. MENOCAL. Yes.

By Senator EDMUNDS:

Q. What is the nature of the country there as to dry land or swamp?

—A. On the south side it is swampy. The west coast is solid land. The extreme northern end is swampy for a very short distance and on the east side is solid elevated land.

Q. So that really the only swampy shores are near the outlet at the very head?—A. Yes, that is just it, and where Lake Managua enters and empties into Lake Nicaragua. There is a kind of a low-land there.

Q. How many square miles of that low-land is there where the outlet of Lake Managua is?—A. I would not like to state.

Q. Oh, state in round numbers what you think.—A. Well, I think 15 or 20 miles.

Q. Fifteen or 20 square miles?—A. Yes.

Q. How much of the low end or south end of the lake—how far on either side is it swamp?—A. Well, the south end I never visited. On the north side there would be no inundation; on the east side near the outlet it may be a half a mile to 2 miles. It is flooded, however, in the rainy season.

Q. So that your permanent elevation, 110 feet, raising the water 3 or 4 feet above its present point, would not materially affect the surrounding country?—A. On the contrary, I think it would be healthy, for the reason that these low lands would be permanently covered, instead of being alternately covered wet and dry as now.

Q. What, in your opinion, is the most difficult engineering, practical problem as to an effective canal there?—A. I do not know that there is anything very difficult. I do not see any serious difficulty on the whole route.

Q. Yes, but you have spoken of the engineering difficulties being now practically solved, but referring to them as some being greater than others.—A. Well, there are some difficulties that have to be overcome.

Q. Where is the greatest difficulty?—A. The greatest difficulties I should say are in the constrction of the dam across the river San Juan and the construction of certain dams and embankments upon the San Francisco Valley.

Q. Is that San Francisco, containing a part of the water that comes out of the lake, a separate and independent river?—A. No, sir; it is a valley intended to be closed by dams and embankments and converted into a lake, and there is another valley here emptying through a narrow gorge into the broad valley of the San Juan, and that is also closed. Now these two valleys are separated by a ridge through which is cut a canal. Consequently you have so many miles of canal navigation through this deep basin without any excavation, except what is required to combine or connect these two valleys. Now, in raising the waters by the construction of the dam across the San Juan 55 feet the upper part of the river is converted into an extension of the lake, and that same level is continued through these different valleys and through the deep cut and beyond through a basin 5 miles long towards the Atlantic and east of the deep cut, made in the same way by the construction of another dam. Consequently the summit level extends from the easterly end of this latter basin to the westerly end of the Tola basin, west of the lake.

Q. That is, it extends how many miles from the Atlantic?—A. From within 12 miles of the Atlantic to 3 miles of the Pacific.

Q. You get the lake-level that whole distance?—A. Yes. It is not quite the lake-level. We call it level for all practical purposes of navigation, but of course the river San Juan must have a fall, and that fall

is estimated at three-fourths of an inch to the mile, or about 4 feet for the 64½ miles of slack-water navigation.

Q. But between those two points there are no locks at all?—A. No locks; no, sir.

Q. Now you have spoken of the San Francisco River and of these basins that you make towards the Atlantic from this big dam?—A. Yes.

Q. Now, where does the water come from, from which you make these lakes?—A. It comes from tributaries of the San Juan.

Q. How are those dams here towards the Atlantic to affect, by making permanent water in those valleys, the health of that region, and how much of the flow that is not necessary for the purposes of canal navigation?—A. It will make the region healthy because it will flood all the lowlands and the water will come to the slope of these steep hills on the sides of the valley.

Q. Take the valley of the San Francisco, which you have spoken of as a tributary of the San Juan—you are building your dams there—how far up the valley of the San Francisco will that water-level go?—A. It will go for about 6 or 7 miles beyond the axis of the canal, and in a valley, almost a level plain.

Q. How wide is that plain?—A. About 6 miles in width and about 5 miles in breadth.

Q. What is this plain now that is to be flooded; are farms and people there?—A. No, sir; not at all. It is most all swampy.

Q. Heavy swamp forests?—A. Yes, enormous forests.

Q. What kind of timber?—A. Well, the timber resembles very much the white oak of this country.

Q. Very large trees?—A. Very large trees, and generally heavy timber, but not very good for construction purposes.

Q. Well, that flow going there permanently will destroy all that?—A. Yes.

Q. And in the end it will be a sheet of open water?—A. Yes.

Q. Which will be in the San Francisco 5 or 6 miles long and 6 or 8 wide?—A. Yes, I have estimated about 3,000 feet of grubbing and clearing as sufficient for the free navigation and anchorage of ships.

Q. Now, as to these artificial lakes that we are speaking of of the San Francisco Valley, are they supplied solely by the waters of the San Francisco River?—A. They are supplied solely by it; yes.

Q. Suppose the San Francisco River does not furnish sufficient water?—A. The basins will be supplied from the San Juan River.

Q. Then they would be supplied besides what the San Francisco furnished from the lake above and the river?—A. Yes.

Q. Now, with that area of surface in this San Francisco Valley is your canal, after evaporation, etc., going to be large enough to keep the level up there without having a tremendous current through it?—A. Yes, sir.

Q. Have you calculated all that?—A. Yes; the current in the canal will never exceed half a mile an hour. The size of the canal will be so proportioned that the current will be small.

Q. What is the dry season of the year there?—A. On the west side it is from November to May.

Q. On the east side, of which we are now speaking?—A. Well, there is no dry season except, perhaps, January to May, but it is not a dry season as it is on the west side, because it rains more or less on the east side at all times of the year.

Q. What is the average rain-fall during the year on the east side?—A. I should say that it is not less than 150 inches.

Q. And falling more or less every month of the year?—A. Yes, distributed through the whole year.

Q. Now take the San Francisco of which we have spoken, and does it not happen that sometimes there is a tremendous flood there?—A. Not a tremendous flood, because the water-shed of the San Francisco Valley is only 85 square miles, and sufficient waste-weirs have been provided for the discharge of the surplus waters.

Q. So you think that in the most tremendous storms that this artificial lake that you are to construct, taking in the San Francisco valley would not get so high as to disturb the canal operations? A. No, sir not at all. The water is always kept about the same level. As soon as the water rises it flows over these spillways [indicating] and is discharged over here.

Q. Since you have been there, in all these years have you had or known of any accurate observations made of the state of the water in the San Juan as regards its rise and fall from day to day?—A. No, sir; not continuous observations. We had observations from 1887 to 1888, showing the rise and fall of the river, but it has not been kept since.

Q. How much did it show that time?—A. We have had rises there of 12 feet.

Q. How would a rise of 12 feet affect your canal operations?—A. Well, it may raise the water in this portion of the canal extending from above the dam to lock number three, on the east side, probably 1½ feet to 3 feet, no more, because we have waste-weirs to provide for these sudden rises of the San Juan River.

Q. But where the river at the utmost has risen according to the observations taken you say the lake itself has only risen 5 or 6 feet?—A. Yes; because there is at present a fall of about 45 or 50 feet in that portion of the river.

Q. How far inland from your harbor at Greytown is this first dam to be built?—A. It is 32 miles.

Q. Now that is your lowest dam on the San Juan?—A. Yes, sir; that is the only dam in that river.

Q. What is the nature of each shore at that place where you propose to build that dam, I mean its geological and topographical formation?—A. The top is red clay, below is rock, and the bottom of the river is either rock or very compact gravel.

Q. What is the width of the river there from shore to shore?—A. At the present time, 900 feet.

Q. What is its depth where you propose to have the dam?—A. The maximum depth is 14 feet near the right bank, gradually decreasing to about a foot and a half at the other bank.

Q. No rock there?—A. There is rock projecting out on both banks from the abutments of the dam.

Q. That appear above the surface now?—A. Yes.

Q. So that you have a secure termination at either end of the dam?—A. Yes.

Q. What kind of a dam do you propose to build there?—A. I have proposed to build a rock-fill dam; that is, a dam made of rock dumped in the river and allow it to take its natural slope. The work of distributing the material will be done by the force of the water and its scouring action on the bottom until the proper equilibrium is established. In this way I expect that the company would have a very cheap and safe dam.

Q. Well, having got your rocks in in that way, how can you make a dam tight?—A. We have so much surplus water that I do not think we will make any efforts to make the dam tight, but if it was required to make it tight, all we have to do is to make a deposit of sand, clay, and other material on the upper slope of the dam.

Q. Do I understand you to mean by a rock-fill dam that way that you merely dump rocks right across; tumble them right in?—A. Yes, rocks weighing a ton or more.

Q. Precisely; but in respect to a structure, ashler or joints, or anything of that kind, you do not do it?—A. No, sir; that I would not regard safe. I regard this as entirely safe.

Q. And you expect to put the rocks in close enough together to produce the elevation you require?—A. We can do that by means of the wire-rope system.

Q. You then there really make a little cataract of bowlders that you put in?—A. That is so.

Q. Is that so of all your other dams?—A. All are expected to be made the same way.

Q. So that, as regards the construction of what in New England we would call a dam of the component and jointed work there of timber or stone there is nothing of the kind required.—A. Nothing at all. I had originally proposed to have these dams built of concrete and ashler, but afterwards I came to the conclusion that this was the safest dam, one that can not be carried away by floods nor affected by earthquakes, which, if anything, would make it more compact. Suppose we had a tremendous storm and extraordinary flood, it might carry a few rocks from the top away, but the rocks won't float; they must lay somewhere on the lower slope. The top of the dam might be lowered a few feet, but the main body of the dam will remain intact and we could repair the damage done by dumping more rock on the crest.

Mr. MILLER. It is simply an immense weight.

Mr. MENOCAL. It is an artificial mountain across the river.

By Senator EDMUNDS.

Q. The dam he proposes is what nature has done in a good many other places. You have spoken of earthquakes, which is an interesting subject to a good many people as regards the stability of such work. You have been down there a good many years, how many earthquakes have you experienced?—A. I never experienced but one or two, and they were so slight as to be of no consequence.

Q. How recent in history has there been any earthquake in that region of country that has overthrown houses, etc.?—A. Not any that I know of, except that the tower of a church and some houses have been slightly cracked.

Q. How long ago were these?—A. In 1845, in the town of Rivas, the church steeple fell.

Q. Where is that?—A. Rivas is about 3 or 4 miles from the line of the canal west of the lake.

Q. How long do you estimate the time that will be necessarily occupied in completing, with adequate funds, the canal?—A. I think one year for preliminary operations and six years, hard work will be sufficient to complete the work.

Q. So that, adequate funds and management being provided, you think it would be safe to say that the canal would be completely done and ready for occupation in eight years, making due allowance for contingencies?—A. Yes.

Q. So that you feel confident that within this century, which is ten years, with adequate funds and management, it would be a moral certainty that the canal would be in operation. Now, tell me about the nature of the country between the northwest side of the lake down to Brito; it is within only about 12 miles from the Pacific, and a descent in round numbers of 110 feet?—A. The country is comparatively a level country, what you might call a slightly rolling country, and it is most all open to cultivation. It is very fertile.

Q. Inhabited?—A. Inhabited, with fair roads for carts.

Q. And ranches, haciendas, and what we call farms, and all that sort of thing?—A. Very beautiful, yes.

Q. Well, does the canal open on some valleys, or is it a direct cut?—A. It goes from valley to valley. It goes from the valley of the river Lajas, which empties into the lake, into another valley of smaller size, and then after crossing the divide into the valley of the Rio Grande where an artificial basin is to be made, and from there to the Pacific it might be said it follows the valley of the Rio Grande.

Q. Now beginning at the lake, how far, following the canal line, is it to the absolutely highest point of the crest of the divide as nature now is?—A. It is 7 miles.

Q. There, then, on that side would be your deepest cut?—A. Yes.

Q. What would be the depth of that cut?—A. Seventy-two feet to the bottom of the canal.

Q. And how long?—A. That depth would be only at one point.

Q. Well say take it for 2 miles?—A. That deep cut is altogether 9 miles long.

Q. What would be the average depth of that?—A. I should say the average depth is about 18 feet above water level.

Q. What sort of material?—A. The material is mostly of rock, covered by 10 or 15 feet of clay or gravel.

Q. Then you would have on an average of about how much depth of rock cutting for that 9 miles?—A. The rock cutting would be about 35 to 40, average.

Q. What is the nature of that rock?—A. It is trap-rock. It is a volcanic rock, easily blasted, and at the same time very good for construction purposes.

Q. Capable of resisting water so it can be used for construction?—A. Yes. It is very well adapted for concrete work.

Q. Does it come out in forms capable of using for masonry?—A. It is strong enough, but very difficult to cut. It is very hard to be cut and dressed. We use it in concrete.

Q. Then you expect to feed your western canal from the lake itself?—A. Yes.

Q. But you have three locks?—A. Three locks; yes, sir.

Q. And they are to cover altogether 110 feet rise?—A. Yes. There will be two locks with 85 feet, 42½ feet to the lock.

Q. That is a tremendous pressure. Those locks you would have to build of good masonry?—A. No; I propose to build them of concrete.

Q. By concrete you mean to take this stone that comes out of your rock cutting for your stone, and then you break that up into pieces of what average size?—A. Not more than 3 inches.

Q. And then you put that in with cement?—A. Cement and sand mixed into mortar, and then ram it in layers.

Q. Have you got any drawings or anything now that would show your proposed method of the construction of those locks?—A. My report is complete so far as a report of that kind can be. It does not

contain the specifications of every piece of work, as that would make it too voluminous, but contains a general description of the works.

Q. Tell me in a general way, now, as to the strength of these locks. You have one that has a head of 42½ feet, and you are going to make that dam, as I will call it, at the foot of the lake?—A. Gates.

Q. Not only gates, but you have got to have side walls and one thing or another. Now, then, to make this part of the work that has got to stand the pressure of 42½ feet head of water, what would be the size of a cross-section of your concrete?—A. That depends a good deal on what is back of the concrete. We always try to get a hill for the excavation of a lock. If the excavation is rock you will understand it does not require very much masonry wall, because the rock itself back of the concrete will hold it. On the other hand, if we have softer material then you will have to proportion the concrete to the material backing the wall.

Q. That is to say, you undertake to fortify all the lower side with concrete?—A. Yes.

Q. Do you mean you are going to make your lock, like Sault Ste. Marie, for instance, all concrete?—A. All concrete lined with timber.

Q. So that the whole stone structure will be concrete?—A. Yes.

Q. Just a simple mass of homogeneous concrete?—A. Yes.

Q. Without any joints or anything else?—A. Yes.

Q. What is the nature of the bottom there where you have the foundation?—A. Rock. Most all excavation for locks will be in rock, so much so that we expect to save a good deal by cutting the lock into the solid rock and then line the excavation with large timber.

Q. So that you think the mechanical problem of resisting the pressure of the weight of water by this concrete work instead of the enormous masonry we have in locks north can be entirely overcome? A. Yes.

Q. Well, when you have got down then to the sea-level at Brito, what sort of a harbor, or what is the contour of land there; what have you to do on the Brito side to make shelter for vessels?—A. On the Brito side we have practically to build a harbor. I would not say we have to improve what we have, but practically we have to build one, but the physical conditions are favorable for the construction of this harbor.

Q. Have you a plan of the harbor?—A. I have not with me, but will send it to you with pleasure.

Q. I wish you would do so.—A. Now, I will explain this [indicating on map]. This is the Brito side. The coast comes just on the edge of that dark spot. What we propose to excavate is either side of the high-water mark. This is the high-water mark. We propose to dredge all this out in order to make a harbor. Now the coast goes this way, and then there is a promontory or projection that extends to deep water. We propose to build a breakwater where you see it indicated here, and another one here, and then dredge from a point outside of the harbor, which will be here.

Q. Now, taking the coast line of Brito as it is now where you intend to make your harbor, what is the rise and fall of the tide there?

Q. Now, at low water, how far out from the present contour of the shore where you are to go into the land with your canal must you go in order to get 30 feet of water?—A. How much out at sea?

Q. Out at sea?—A. I should say about 1,500 feet.

Q. Is that a coast of rather a straight line?—A. Yes; rather a straight line.

Q. How are you to protect it then from storms?—A. By the construction of these two breakwaters, which will be built from the rocks coming out from the divide cut.

Q. What kind of a breakwater do you propose to build there?—A. Riprap, out of large stones, just the same as the Holyhead breakwater.

Q. Not like the breakwater out from Amsterdam to the North Sea, which, I believe, is built of great rocks in tubes and laid up?—A. No.

Q. Do you know how that North Sea breakwater has stood the elements? I saw it, when it was just about being completed, in 1879.—A. It has stood very well, but it is a very expensive work. The Holyhead breakwater is built of riprap and is doing its work just as well. In this case we have a certain amount of rock we have to dispose of, and we have no other use for it except the construction of such breakwater and of locks and dams, and the balance must be disposed of by dumping on the poil banks.

Q. What is the length of these contemplated breakwaters?—A. One is 900 feet long, extending to 40 feet depth of water, and the other is between 500 and 600 feet. The object of the latter is merely to narrow the entrance so that the swell will produce no disturbance in the harbor.

Q. How far apart will the head of the two breakwaters be?—A. Six hundred feet.

Q. And in a right line from the end of each one of those breakwaters to the land part of the canal as it comes in would be how far?—A. That would be some 3,000 feet.

Q. Would that make a harbor long enough in heavy weather for a vessel to run in and round to and come to anchor?—A. Well, some vessels have to be careful in doing so, and it will always be safer in bad weather to tow in sailing vessels.

Q. In what direction do these storms come on that coast of Brito?—A. They generally come from the southwest. I have submitted this plan of the harbor to the Navy Department, and they approve it and think it very good. The storms come from the southwest and the harbor will be protected, and the breakwaters are so placed that a heavy sea, after passing the outer end of one breakwater, will not go into the harbor, but pass beyond the end of the other breakwater.

Q. What are the natural resources of that country within 100 miles on either side of this canal and lake?—A. Principally cattle raising, coffee, indigo, sugar-cane, beans, rice, plantains, bananas, and all tropical fruits.

Q. How much do you suppose, as a mere round estimate, population there is within two parallel lines, each drawn 100 miles away on either side of the line of your canal from sea to sea, making a cross-section of 200 miles in a straight course of 125 miles, or whatever it may be across there?—A. I should say 250,000.

Q. A sparse population, then?—A. Very much so.

Q. Well, the parts of that section that I have now assumed to give a description of that are not occupied by cultivation and clearage. What sort of forests are there; any valuable timber of any kind?—A. Very valuable. It depends upon what side of the lake you are on. On the west side there is very valuable timber. Mahogany, rose-wood, ebony, and all kinds of timber for construction, very valuable; while on the east side the timber is generally soft, heavy, and not suitable for permanent construction.

Q. Of no particular value, then, for purposes of utility or commerce for exportation?—A. No, sir.

Q. The only resources of the country, then, would be those that come

from the cultivation of the soil?—A. The cultivation of the soil and mines.

Q. Are there mines there?—A. Yes, silver and gold mines.

Q. Any coal?—A. Coal has been found recently and excavations are now being made to see to what amount it can be obtained.

Q. Is what they think they have found anthracite or bituminous?—A. Bituminous.

Q. Any iron?—A. No, sir.

Q. Any copper?—A. No, sir.

Q. So that, as far as known, the only value in ore is gold and silver?—A. Gold and silver.

Q. No cinnabar?—A. No, sir.

Q. Are there any fine qualities of stone there—marbles or granite?—A. No, sir.

Q. All the rock is volcanic of one form or another?—A. All volcanic.

The committee adjourned.

SENATE OF THE UNITED STATES,
COMMITTEE ON FOREIGN RELATIONS,
Thursday, June 5, 1890.

The subcommittee met at 10.30 a. m. Present, Senators Edmunds (chairman), Dolph, and Payne.

STATEMENT OF HIRAM HITCHCOCK.

By Senator EDMUNDS:

Q. Please state your full name and residence?—A. Hiram Hitchcock, Fifth Avenue Hotel, New York.

Q. You are president of the Maritime Canal Company of Nicaragua, chartered by Congress?—A. Yes, sir.

Q. How long have you been president?—A. Since its organization, May 4, 1889.

Q. Who were the people who participated in the organization of the company, if you have any papers to show?—A. The incorporators named in the charter took part in the organization.

Q. All of them?—A. Not all of them, but about two-thirds of them, and the following committee was appointed at the meeting of the incorporators to act as a committee of five under said charter to open books of subscription to the capital stock: Hiram Hitchcock, Horace L. Hotchkiss, Francis A. Stout, R. A. Lancaster, and A. C. Cheney.

Q. What is that paper you have in your hand?—A. This is the first annual report which the company has to make to the Government of the United States under the terms of the charter, and which was made last December.

Q. That is a copy of it?—A. Yes, sir.

Q. Have you one to spare?—A. I brought it for the committee.

The report is as follows:

REPORT OF THE MARITIME CANAL COMPANY OF NICARAGUA.

To the honorable Secretary of the Interior:

Pursuant to section six of the act of Congress entitled "An act to incorporate The Maritime Canal Company of Nicaragua," approved February 20th, 1889, which provides that said company shall make a report on the first Monday of December in each year to the Secretary of the Interior, and in accordance with the instructions received from you prescribing the form of such report and the particulars to be given thereby, and by the express authority of the said company, we, the undersigned, Hiram Hitchcock, president, and Thomas B. Atkins, secretary of the said The Maritime Canal Company of Nicaragua, do hereby make the following report on behalf of the said company, and do certify and declare as follows:

First. That a meeting of the incorporation named in the said act of Congress was held on the seventh day of March, 1889, pursuant to call, at No. 36 Wall street, in the city of New York, when the charter granted by Congress was unanimously accepted, and a communication to that effect forwarded to the Secretary of State. That at the same meeting Messrs. Hiram Hitchcock, Horace L. Hotchkiss, Francis A. Stout, R. A. Lancaster, and A. C. Cheney were chosen by a majority of the number from those named in the aforesaid act as the five incorporators empowered by said charter to open books of subscription to the capital stock of the company and to receive subscriptions for the same.

Second. That the said committee of incorporators gave thirty days' notice of the time and place of the opening of the books of subscription to the capital stock of the said company by publication in one daily newspaper in New York City and one newspaper in Managua, Nicaragua, and one in San José, Costa Rica, and that, pursuant to such notice, the said books of subscription were duly opened, on the 22nd day of April, 1889, at No. 44 Broadway, in the city of New York.

Third. That a meeting of the subscribers to the said capital stock was held on the second day of May, 1889, pursuant to notice, at number 44 Wall street, in the city of

New York, and at such meeting the following board of fifteen directors was duly elected by the stockholders of said company in the manner provided for in the said act of incorporation, to serve for the periods set opposite their respective names, to wit:

Charles P. Daly, Frederick Billings, Daniel Ammen, Horace L. Hotchkiss, Joseph E. MacDonald, to serve for three years.

Francis A. Stout, Alfred B. Darling, Franklin Fairbanks, C. Ridgeley Goodwin, Alexander T. Mason, to serve for two years.

Joseph Bryan, James Roosevelt, Hiram Hitchcock, Horatio Guzman, Pedro Perez Zeledon, to serve for one year.

That a majority of the above-named directors are citizens and residents of the United States, and that all of them are stockholders in the Maritime Canal Company of Nicaragua.

Fourth. That on the fourth day of May, 1889, a meeting of the directors, elected as aforesaid, was held pursuant to notice, at number 44 Wall street, in the city of New York, and at such meeting by-laws were adopted, and the following officers were elected for the ensuing year, to wit:

President, Hiram Hitchcock.

Vice-President, Charles P. Daly.

Secretary and treasurer, Thomas B. Atkins.

That all of the officers so elected are citizens and residents of the United States.

Fifth. That in accordance with the provisions of said act of incorporation, the principal office of The Maritime Canal Company of Nicaragua has been established in the city of New York, at No. 44 Wall street.

Sixth. That The Maritime Canal Company of Nicaragua has completed the axial surveys and final plans of the proposed interoceanic canal, and the same have been officially approved by the Government of Nicaragua. That on the third day of June, 1889, the company began the preliminary work of construction at Greytown, and on the 8th day of October following commenced the work of excavation. That the Government of the Republic of Nicaragua has officially recognized and declared by decree that the construction of the canal was formally commenced, in accordance with the terms of the concession, on the said 8th day of October, 1889.

That since the said 3d day of June, 1889, the company has established permanent headquarters at Greytown, erected store-houses, hospitals, dwellings, and other buildings, constructed several miles of aqueduct, cleared parts of the San Juan and Deseado Rivers, laid several miles of broad-gauge railroad, constructed about thirty-five miles of telegraph line, and cleared the first part of the route of the canal. That it has shipped to Greytown and landed at that port large quantities of machinery, tools, lumber, piles, boats, and other materials necessary for the establishment of the plant to be used in the construction of the said canal. That, in addition to the above, the company has organized in Nicaragua a complete hospital service and ambulance corps, and has perfected the sanitary arrangements in and about its camps and headquarters.

Seventh. That during the coming winter the work of railroad and telegraphic construction will be continued and prosecuted with energy, the building of a breakwater for the Atlantic port of the canal will be commenced, and the dredging work will be pushed forward with all possible dispatch. That several large dredges have recently been contracted for, and other contracts relating to the construction of the canal are now in course of negotiation with responsible contractors, and it is expected they will be closed at an early date.

Eighth. That ten thousand one hundred and forty-five shares of the capital stock of The Maritime Canal Company of Nicaragua have already been subscribed at par, amounting in the aggregate to the sum of one million fourteen thousand five hundred dollars ($1,014,500), of which amount six hundred and one thousand four hundred and fifty ($601,450) dollars have been paid into the treasury of the company in cash. That the other assets of the company consist at present of the property, rights, privileges, and franchises now owned by it in Nicaragua and New York.

Ninth. That since the third day of June, 1889, the company has expended upon the work carried on in Nicaragua more than five hundred thousand ($500,000) dollars, and that its liabilities, which consist chiefly of expenditures incurred during the month of November, do not exceed the sum of fifty thousand ($50,000) dollars.

Tenth. That the details of the work to be done on the canal are briefly as follows: The construction of a breakwater at or near Greytown on the Caribbean Sea, and dredging thence to the westward ten miles through alluvial ground to the place where a lock of thirty-one feet lift will be built. At two miles beyond will be constructed a second lock or double lock of the combined lift of seventy-five feet, and a dam across the small stream Deseado, above which will be a basin affording four and one-quarter miles of free navigation; then a rock cut about two and three-quarter miles in length, followed by twelve miles of free navigation in the valleys of two small rivers, the San Francisco and the Machado. Here the waters will be raised by dams and embankments so as to form basins, which will connect directly with the

San Juan River above a large dam to be built across that river. Said dam will raise the waters in the river and lake and secure additional free navigation of sixty-four miles in the river and fifty-six and one-half miles across the lake. On the western side of the lake the canal will enter a cut of slight depth in the earth and rock of nine miles in length, issuing thence into the Tola basin, with five and one-half miles of free navigation, which will be obtained by damming the Rio Grande. At this dam a series of locks will lower the level eighty-five feet, and the canal will proceed in excavation down the valley of the Rio Grande a distance of two miles to the last lock, a tidal lock of twenty to thirty feet lift, below which the canal will enter the upper portion of the harbor of Brito, one and one-half miles from the Pacific.

In witness whereof we have hereunto set our hands this second day of December, in the year of our Lord one thousand eight hundred and eighty-nine, and affixed hereto the corporate seal of said company.

HIRAM HITCHCOCK,
President.

[Seal of Maritime Canal Company of Nicaragua.]

THOS. B. ATKINS,
Secretary.

STATE OF NEW YORK,
City and County of New York, ss:

Hiram Hitchcock, being duly sworn, says: That he is the president of said The Maritime Canal Company of Nicaragua; that he has read the foregoing annual report and knows the contents thereof, and that the same is in all respects correct and true.

HIRAM HITCHCOCK,
President.

Sworn to before me this 2nd day of December, 1889.
[Notarial seal.]

NESTOR PONCE DE LEON,
Notary Public, N. Y. C., 25.

STATE OF NEW YORK,
City and County of New York, ss:

Thomas B. Atkins, being duly sworn, says: That he is the secretary of said the Maritime Canal Company of Nicaragua; that he has read the foregoing annual report and knows the contents thereof, and that the same is in all respects correct and true.

THOS. B. ATKINS.

Sworn to before me this 2nd day of December, 1889.
[Notarial seal.]

NESTOR PONCE DE LEON,
Notary Public, N. Y. C., 22.

STATE OF NEW YORK,
City and County of New York, ss:

On the second day of December, in the year 1889, before me personally came Thomas B. Atkins, known to me to be the secretary of the Maritime Canal Company of Nicaragua, and with whom I am personally acquainted, who, being by me duly sworn, did depose and say: That he resided in the city of New York; that he was the secretary of The Maritime Canal Company of Nicaragua; that he knew the corporate seal of said company; that the seal affixed to the foregoing report was such corporate seal; that it was so affixed by order of the board of directors of the said company, and that he signed his name thereto by the like order as secretary of the said company.

And the said Thomas B. Atkins further said that he was acquainted with Hiram Hitchcock and knew him to be the president of said company; that the signature of the said Hiram Hitchcock subscribed to the said instrument was in the genuine handwriting of the said Hiram Hitchcock, and was thereto subscribed by the like order of the said board of directors, and in the presence of him the said Thomas B. Atkins.

In witness whereof I have hereunto set my hand and official seal this second day of December, A. D. 1889.
[Notarial seal.]

NESTOR PONCE DE LEON,
Notary Public, N. Y. C., 25.

Q. This report shows the proceedings down to the time it was made?—A. Yes. If you will allow me to say further, that committee opened the books and proceeded in accordance with the charter and a board of directors was elected, which organized and elected its officers May 4, 1889.

By Senator DOLPH:

Q. How much stock was subscribed?—A. There was subscribed at that time 145 shares, mainly by the different incorporators, for the purpose of organization; no other subscriptions were offered.

By Senator EDMUNDS:

Q. What was the par value of the shares?—A. One hundred dollars.

By Senator DOLPH:

Q. Does this report show the stockholders and the amount subscribed by each?—A. Not the individual names. I could have brought the detailed statement of the list of names, but the different incorporators subscribed for a few shares each for the purpose of effecting the organization of the company.

By Senator EDMUNDS:

Q. How much was subscribed down to the 2d of December?—A. In all 10,145 shares, and I have brought the certificate of the secretary of the company, showing the subscription down to the present time.

Q. Just read the certificate.—A. It is as follows:

I, Thomas B. Atkins, secretary of the Maritime Canal Company of Nicaragua, hereby certify that the entire issue of the capital stock of the Maritime Canal Company of Nicaragua is 10,145 shares, all of which is now outstanding; and that of said issue 10,000 shares have been paid for in full in cash, and 145 shares have been paid for, 10 per centum thereof in cash, and 90 per centum thereof is payable at the option and upon the call of the company.

In certification of which, witness my hand this 3d day of June, 1890.

THOMAS B. ATKINS,
Secretary.

By Senator DOLPH:

Q. You say you have nothing to show who are the present stockholders?—A. No, sir, I have not. I could have brought you that list. It includes the incorporators under the charter. I think they are all down for one or more shares. I can give you that list of names from a copy of the charter here if it is important.

By Senator EDMUNDS:

Q. No; we know who those are. We would like to have you send us a list of the names of all the present stockholders, and the number of shares standing to the credit of each.—A. I will do that. It is as follows:

List of shareholders of The Maritime Canal Company of Nicaragua, chartered by the United States of America:

	Shares.		Shares.
Charles P. Daly	5	J. E. McDonald	5
Henry R Hoyt	5	C. R. Goodwin	5
Robert Sturges	2	Frederick Billings	5
Alexander J. Mason	1	A. G. Menocal	5
F. A. Stout	5	R. A. Lancaster	5
H. L. Hotchkiss	5	Henry A. Parr	5
Henry C. Taylor	5	J. F. O'Shaughnessy	5
A. C. Cheney	5	H. Guzman	1
H. Hitchcock	5	Thomas B. Atkins	1
F. Fairbanks	5	C. H. Stebbins	5
A. B. Darling	5	J. Aldigé	5
James Roosevelt	5	C. Devries	5
Daniel Ammen	5	E. F. Beale	5
A. S. Crowninshield	5	Joseph Bryan	5
J. W. Miller	5	The Nicaragua Canal and Construction Company	10,000
F. F. Thompson	5		
G. H. Robinson	5		
G. E. Kissel	5	Total	10,145

I, Thomas B. Atkins, secretary of the Maritime Canal Company of Nicaragua, hereby certify that the foregoing is a correct list of the shareholders of the company and of their respective holdings as set opposite their respective names.

Witness my hand this 7th of June, 1890.

THOMAS B. ATKINS,
Secretary.

Q. Who is the secretary of your company?—A. Thomas B. Atkins.

Q. What is his address?—A. 44 Wall street.

Q. Who is the treasurer?—He is also the treasurer of the company. Here is a complete list of the directors and officers of the company. We had an annual meeting in May, 1890.

Directors for three years.—Joseph Bryan, James Roosevelt, Hiram Hitchcock, Horacio Guzman, Thomas B. Atkins.

Directors for two years.—Charles P. Daly, Frederick Billings, Daniel Ammen, Horace L. Hotchkiss, Joseph E. McDonald.

Directors for one year.—Francis A. Stout, Alfred B. Darling, Franklin Fairbanks, C. Ridgely Goodwin, Alexander T. Mason.

President, Hiram Hitchcock; vice-president, Charles P. Daly; secretary and treasurer, Thomas B. Atkins.

Executive committee: Frederick Billings (chairman), Charles P. Daly, Horace L. Hotchkiss, Alexander T. Mason, Hiram Hitchcock.

That is the list as it now stands. The only change from last year was the retirement of Mr. Zeledon, of Costa Rica, and the election of Mr. Atkins in his place.

By Senator DOLPH:

Q. Does your report to the Government show the financial condition of the treasury; does it contain a statement of the assets of the company at the time it was made?—A. The report to the Government, of which this is a copy, was made in December. It states the facts with reference to the organization and the subscription of stock and expenses and disbursements to that time. In February, before the year from the passage of the charter had expired, I also made a report to the Government, as required by the charter, that we had received more than $1,000,000 as payments on account of the stock of the company. I have here a statement for you of the financial status of the company at the present time, the treasurer's statement.

Q. Yes; that is what I was inquiring about.—A. I will read it.

I, Thomas B. Atkins, treasurer of the Maritime Canal Company of Nicaragua, hereby certify that I have received as treasurer of said company, during the year ending May 1, 1890, $1,001,450, all of which has been paid in on subscriptions to capital stock; of which amount I have disbursed for construction and other purposes during the year, $830,161.87, and have remaining, May 1, 1890, a balance in the treasury of $171,283.13.

In certification of which, witness my hand this 3d day of June, 1890.

THOMAS B. ATKINS,
Treasurer.

By Senator EDMUNDS:

Q. Now state in that connection what are the outstanding obligations of your company?—A. We have no outstanding obligations that are due. Our bills due are all paid. There may be, however, some small bills not yet audited. At the time this report was made, in December I think, there were about $50,000 of expenses that might be presented for payment.

By Senator DOLPH:

Q. And the $800,000 paid over to the construction company?—A. Yes.

Q. So that it was not disbursed by your company?—A. No, sir; but

it has been disbursed, on vouchers by the construction company, for work done under their contract with us.

By Senator EDMUNDS:

Q. Well, when you paid over that $800,000, in round numbers, was that in advance or for work actually performed?—A. For work actually performed.

Q. Well, what funds are they working on now? I understand from Mr. Miller that the work is progressing in a diligent and satisfactory way.—A. They are going on with their own money, and as fast as they present us with proper vouchers for work, we must, in order to pay them, obtain money on stock subscription or on bonds.

Q. Now, what is the arrangement between your company and the construction company?—A. The arrangement is as follows, and I have brought a copy of the papers to leave with you. This is the provisional contract under which we were acting.

Q. The temporary contract.—A. Yes.

Mr. Hitchcock read the contract as follows:

I, Thomas B. Atkins, secretary of The Maritime Canal Company of Nicaragua, hereby certify, that on the 24th day of May, 1889, there was held at the office of the company, 44 Wall street, in the city of New York, a meeting of the executive committee of the board of directors of The Maritime Canal Company of Nicaragua, duly convened; that at said meeting there was presented a letter from The Nicaragua Canal Construction Company, of which a certified copy, marked Exhibit A, is hereto attached. That a reply thereto, of which a certified copy, marked Exhibit B, is hereto attached, was duly authorized, and that a second letter from The Nicaragua Canal Construction Company, of which a certified copy, marked Exhibit C, is hereto attached, was re-received by said executive committee, was considered, and was ordered on file. In certification of all of which,

Witness my hand this 3d day of June, 1890.

THOMAS B. ATKINS,
Secretary.

EXHIBIT A.

OFFICE OF THE NICARAGUA CANAL CONSTRUCTION COMPANY,
44 *Wall Street, New York, May* 24, 1889.

THE MARITIME CANAL COMPANY OF NICARAGUA:

GENTLEMEN: The Nicaragua Canal Construction Company hereby offers to do the entire work of every kind and nature of constructing the interoceanic canal to be built by your company, and in accordance with the plans of A. G. Menocal, as approved on the 9th day of March, 1889, by the board of civil engineers to whom the same was submitted for examination, and also according to any modifications or changes that may hereafter be made in said plans which do not substantially vary from the general route as now laid down in Mr. Menocal's plans or increase the expenses of constructing the same, and to begin the work at once and to complete the same in all respects as required by the stipulations and conditions in the concessions held by your company, for the sum of $200,000,000 in the first mortgage bonds of your company and $75,000,000 of the capital stock, payments to be made in equal proportions of stock and bonds every thirty days for such portions of the work as the engineers of your company shall certify have been completed, the work to be begun at once.

As a guaranty of good faith this company hereby agrees to subscribe for $100,000,000 of the stock of your company, and to pay for the same in cash.

Yours very truly,

A. C. CHENEY,
President of the Nicaragua Canal Construction Company.

I, Thomas B. Atkins, secretary of the Maritime Canal Company of Nicaragua, hereby certify that the foregoing is a true and correct copy of a letter received May 24, 1889, by the Maritime Canal Company of Nicaragua from the Nicaragua Canal Construction Company.

Witness my hand this 3d day of June, 1890.

THOMAS B. ATKINS,
Secretary.

To that I made the following reply:

EXHIBIT B.

THE MARITIME CANAL COMPANY OF NICARAGUA,
44 *Wall Street, New York, May* 24, 1889.

To the NICARAGUA CANAL CONSTRUCTION COMPANY:

GENTLEMEN: Your offer to begin at once the construction of the Nicaragua Canal is at hand.

You are hereby authorized and directed to begin such construction work at the earliest possible moment, with this understanding and agreement: That, if within three months this company does not accept your proposition or execute a contract with your company that shall be mutually satisfactory, then, in such an event, this company will re-imburse your company for all the expenditures incurred in connection with the construction work and 10 per cent. in addition thereto.

Yours, very respectfully,

HIRAM HITCHCOCK,
President of the Maritime Canal Company of Nicaragua.

I, Thomas B. Atkins, secretary of the Maritime Canal Company of Nicaragua, hereby certify that the foregoing is a trne and correct copy of a letter delivered by me May 24, 1889, to the president of the Nicaragua Canal Construction Company.

Witness my hand this 3d day of June, 1890.

THOMAS B. ATKINS,
Secretary.

That, of course, was because we could not make a large contract with any company at that point of time, and therefore we reserved the right to simply pay them for what they did and 10 per cent. additional.

Q. Well, that is within three months?—A. If we did not make a contract within three months. Well, we did not make a contract within three months.

Q. So that as the thing stood they were going on under this authority and you were either bound to make a contract that was mutually satisfactory or else you were bound to re-imburse them with 10 per cent., profit?—A. That is it exactly. To that they responded as follows:

EXHIBIT C.

OFFICE OF THE NICARAGUA CANAL CONSTRUCTION COMPANY,
44 *Wall Street, New York, May* 24, 1889.

HIRAM HITCHCOCK, Esq., *President of the Maritime Canal Company of Nicaragua:*

DEAR SIR: I beg to acknowledge receipt of your letter of the 24th instant, authorizing and directing this company to begin the construction of the Nicaragua Canal at the earliest possible moment, upon terms and conditions therein stated.

In reply, I beg to advise you that this company will, in compliance with your directions, commence the work of constructing the Nicaragua Canal at once; and to that end will dispatch an expedition to Nicaragua on the 25th instant.

Very respectfully, your obedient servant,

A. C. CHENEY,
President of the Nicaragua Canal Construction Company.

I, Thomas B. Atkins, seeretary of the Maritime Canal Company of Nicaragua, hereby certify that the foregoing is a true and correct copy of a letter received May 24, 1889, by the Maritime Canal Company of Nicaragua, from the Nicaragua Canal Construction Company.

Witness my hand this 3d day of June, 1890.

THOMAS B. ATKINS,
Secretary.

That was the 25th of May a year ago. We regarded this as entirely sufficient for us because it left us perfectly free (without any obligation

as to stock or bonds to any one) to pay them for what they had done and 10 per cent. and stop at any time.

Q. And take it off their hands?—A. Yes.

Q. Now, then, what further steps were taken?—A. They immediately sent out an expedition and work commenced there on the 3d of June. The progress of that work is fully stated in this report to the Government of the 1st of December and in this further report which includes everything down to the present time, and which is as follows:

Since the commencement of operations in Nicaragua the company, with funds already obtained, has established a complete and perfect organization at Greytown, from which point active operations are being conducted, and has accomplished besides many other important works of installation and construction. The final plans and detailed surveys of the canal, its harbors, locks, and other accessory works, have been completed and verified, and large sums of money have been expended for engineering works in locating railroads, making rock borings at the divide and other places along the line of the canal, and in perfecting the location of the route from ocean to ocean. Permanent headquarters have been established at Greytown, large barracks, storehouses, hospitals, dwellings, and other buildings have been erected, and wharves and warehouses built for the receipt and storage of supplies. Parts of the San Juanillo, Deseado, San Francisco, and other navigable streams through which the canal will pass, have been cleared of obstructions to navigation, and several miles of the route of the canal between the harbor and lock number one have been grubbed and cleared and made ready for dredging. The company has built over a mile of broad-gauge railroad, constructed over 70 miles of telegraph and telephone lines, and has also landed at Greytown large quantities of machinery, tools, lumber, piles, creosoted timber, boats, steam launches, lighters, pile-drivers, and other materials and equipment necessary for work in restoring the harbor, and for use in the construction of the canal. It has built over 700 feet of the breakwater intended to protect the harbor entrance from the effects of shifting sand on the coast, and has also under construction an aqueduct 13 miles long, which is to supply Greytown and the company's headquarters with pure and fresh water from the mountains. Contracts have been let for dredging the bar and harbor, and for the building of 17 miles of railroad from Greytown to the divide, and work under the same will be commenced on May 15, 1890. Some of the dredges contracted for are now on their way to Nicaragua, while others are in course of construction. Large quantities of railroad supplies, locomotives, steam excavators, water piping, and other materials of construction necessary for the railroad, breakwater, aqueduct, and other works, are to be forwarded to Greytown every month, and, in short, the whole work is being pushed forward as rapidly as possible.

That is the report of the work. The work, of course, has been done by the Construction Company.

Q. How much has been expended in all, so far, in round numbers?—A. In all, I should say (I am not entirely familiar with the later details of expenditure, but I am tolerably well up in it), from first to last, about a million and a half has been expended. That of course includes the expenses from the beginning.

Q. Who is the secretary of that company?—A. Mr. Jacob W. Miller, who is the president of the Boston and New York (New London) Railway Company.

Q. Who is the treasurer?—A. Henry R. Hoyt.

By Senator DOLPH:

Q. How is it that the difference between the $800,000 paid out by your company and the million and a half has not been presented?—A. I stated this was from the beginning. Now in the first place the Nicaragua Canal Association was formed, and the Construction Company was its successor as to work of construction. The association expended a quarter of a million dollars before the Construction Company took hold, so that including that, and what the Construction Company has

done, and done in advance of payment, I understand it is about a million and a half dollars.

Q. Do you pay interest on advances as the money is expended by the Construction Company?—A. No, sir; the contract does not call for it.

By Senator EDMUNDS:

Q. Are any of the officers of the Maritime Canal Company members of the Construction Company?—A. Not as officers; they are stockholders. The officers are entirely different.

Q. The management is entirely separate?—A. Entirely separate.

By Senator DOLPH:

Q. Can you state how nearly identical the stockholders of each company are?—A. Well, I should say all the stockholders of the Maritime Company are also stockholders of the Construction Company.

By Senator EDMUNDS:

Q. Are any of the stockholders of the Construction Company, aside from the ones you have named, stockholders in the Maritime Company?—A. No, sir.

Q. But the Construction Company itself is a stockholder to the extent of $1,000,000?—A. Yes; and the Construction Company has a large list of stockholders all over the country.

Q. Have you had any further transactions with the Construction Company looking to the future as to what sort of a permanent contract shall be made?—A. We have arranged and agreed upon the leading points of a permanent contract. The original draft of that contract I did not bring with me. The contract has never been signed because it is not quite complete. It can not be completed until we know a little more as to what our securities will bring in order to know how many securities to issue, and in order to fix a compensation in securities. All those questions will have to be settled before the contract can be fully completed. I have the synopsis of the contract here.

Q. Is there any point of difference between your company and the Nicaraguan Government now outstanding?—A. No, sir, there is no point of difference whatever. I may as well perhaps say, as you ask me the question, with reference to that, that there is no point of difference remaining unsettled between the company and Nicaragua at the present time. That leads me to say (without assuming to be able to give you gentlemen the least information on that point) that it is proper that you should know from us officially the relations which exist between us and Nicaragua, and in fact Central America generally. It is, as I said before, perhaps unnecessary to state these facts, but there are complicated questions. The rights to the San Juan River, the boundary questions between Nicaragua and Costa Rica, always come up when any question of transit across that isthmus arises. You will find that under Tyler's administration, in 1842, this matter was somewhat considered by Mr. Webster, and it has been before every Secretary of State in some aspect from that time to this. It involves the canal question. Now the question of the respective rights in this particular route was supposed to have been settled under the treaty of limits between those two powers of 1858. Under that treaty, while Nicaragua owns the entire route, yet Costa Rica has the right to navigation and has the right to be consulted.

Now I come down to the point where it concerns this particular con-

cession. The Nicaragua Canal Association, which was formed in 1886, sent out early in 1887 to obtain a concession to build this canal. Nicaragua had the right to give this concession, and in it gave us the fullest freedom to locate the route, but for the reason that the treaty of 1858 gives to Costa Rica the right of navigation and that in the construction of the canal waters would be made to overflow Costa Rican territory, Costa Rica took the ground that Nicaragua should have recognized that treaty to the extent at least of obtaining the consent of Costa Rica to this concession. Nicaragua did not do that. We accepted the concession in good faith, believing Nicaragua had the absolute right to grant it. The first thing we encountered was a protest, thirty or forty days thereafter, from Costa Rica, announcing that the concession was of no value because she had not been consulted. The Government of Nicarauga could have consulted her before, and have gone on and satisfied her for any damages which the overflow might do to her territory, but we were left to make terms with Costa Rica. We then for six months negotiated to obtain a concession from Costa Rica, when this was accomplished. Nicaragua immediately protested against our concession from Costa Rica. We assured Nicaragua that we had accepted the concession from Costa Rica simply in the nature of a quitclaim of any rights she might have; and when we formed our company and accepted the Costa Rica concession we accepted it only in so far as it did not conflict with the territorial rights and proprietary interests of the Republic of Nicaragua. Thus we were entirely open and frank in the whole transaction.

Now you will readily see that up to that point it was useless to talk about the sale of bonds with the protest of either government pending Then when the first expedition, sent out after the Maritime Company was organized, commenced work on the 3d of June, 1889, Nicaragua officially notified us that, while she would protest against our concession from Costa Rica, yet she would not go beyond protesting and would not interfere with the construction of the canal. But in July Nicaragua ordered the stopping of our work at Greytown. We did not pay attention to that order, because she immediately modified it by saying that she would not regard the work as an official commencement of permanent work. The troubles continued and were fostered by parties from England, whose names I know, who wanted to have the 24th day of October arrive and the Government of Nicaragua not recognize that we had begun our work, so that our concession would lapse. On the 16th of September, 1889, the Government of Nicaragua notified us officially that if we did not confine ourselves within her limits, thereby ignoring any rights or claims of Costa Rica, she would not approve our surveys nor recognize the commencement of the work of construction, and that on the 24th of October she should consider our concession as having lapsed.

This course of Nicaragua was so unjust, that I went immediately to the Government here, through the State Department. I stated the case fully. Mr. Blaine met the question with great fairness and promptness, and immediately wired to the American minister at Central America to go to Nicaragua and say to the Nicaraguan Government that he was surprised at the report of the attitude of the Nicaraguan Government towards this company, and wished him to examine into the facts and report to the State Department here, and at the same time to assure the Government of Nicaragua that the Government of the United States would not remain passive and see the rights of its citizens threatened. That dispatch of Mr. Blaine had the desired effect. Mr. Mizner and

Mr. Hall, our permanent agent there, arranged a plan by which Nicaragua could recede from her position with dignity, which was in the form of a joint declaration. On our part we agreed to go on and build the canal in good faith under the concession, and the Nicaraguan Government agreed to approve the surveys and work, so that the work of construction was recognized officially as commenced on the 8th of last October. I will submit copies of the telegrams between the President of Nicaragua and myself.

[Copy of telegram sent October 9, 1889.]

His excellency PRESIDENT OF NICARAGUA,
Managua:

Please accept my sincere congratulations upon the happy termination of all differences, and the company's assurance that it will vigorously prosecute the work of the canal in the interest of Nicaragua and the whole commercial world.

HIRAM HITCHCOCK,
President Maritime Canal Company of Nicaragua.

[Translation of telegram received from the President of Nicaragua in reply to ours of October 9.]

MANAGUA, *October* 11, 1889.

President of the Maritime Canal Company of Nicaragua:

I congratulate myself jointly with you upon the happy settlement of the canal question, and with the greatest satisfaction I offer the cordial assistance of my Government to the efforts of the company for the realization of this grand enterprise.

ROBERTO SACASA,
President of the Republic.

Q. So that all this work was begun before?—A. Surveys were begun in November, 1887, and $250,000 had been spent on the work prior to June, 1889, and everything had been entirely harmonious except in the matter of protests, as stated, down to the point when this attempt was made through various influences to cause the Government to dispossess us of our concessionary rights.

Now you can readily see that with protests from Costa Rica at the very start, with protests from Nicaragua, with all these troubles, this company was not in a position to say one word about the sale of stock or bonds until the 8th of last October. Very soon after that we were confronted with one of the tightest money markets New York and the financial world has seen of late, which has only in the last sixty days been relaxed, so there are strong reasons why we have never attempted to place the securities of the company.

We have had a great many questions asked about our securities, and we have always been willing to listen to them.

Q. You mean questions asked you by people who represent capital?—A. Yes; people come—we do not always know how much capital they represent—and say "We can place your bonds, so and so." Our reply has been, "We can not offer our bonds under present circumstances." Of course the time is soon coming when we can take up the subject. The Government of Nicaragua is very friendly now, and most thoroughly in earnest and ready to help us in reference to this canal all in its power. But by October next we are pledged to put into that work $2,000,000. Now we shall get that $2,000,000 into the work. Senator Miller, president of the Construction Company, assures me that there is no question about it; so that there will be no reason for the Nicaraguan Government raising any objection that we have not complied with all the terms

of the concession; but of course it will depend somewhat upon plots and schemes, and upon the eyes of her engineers. They may see five or six millions and may not see one. Between Nicaragua and Costa Rica there is always danger of difficulty coming up in reference to this canal and the question of their respective rights there. I had a telegram the other day that the Costa Rican Government had appointed another commission to confer with Nicaragua again as to that. Nicaragua at this stage of the proceedings might simply propose to pay for the 400,000 or 500,000 or 600,000 acres of land (which may be overflowed by our dams) of Costa Rican territory, and arrange as to navigation, etc., then there could be no further claim upon Nicaragua or upon us. But until the respective rights of those two powers are settled there will always be more or less difficulty.

There is another point I would like to mention. I have always felt entirely secure as to the position of this company as chartered by Congress, not only because it was chartered by Congress, but on account of the treaty of 1867 between the United States and Nicaragua. The terms of the treaty are particularly strong and conclusive. The United States has the same right over the Nicaragua route under the treaty of 1867 as it has over the Panama route. If there is any difficulty that obstructs our transit through that territory the United States has the right to go in and preserve order just as she has done on the Panama route under the treaty with Colombia. So that I have felt entirely confident that in the end the company, if it went on in good faith, which it surely will, will receive the protection of the United States, not only because it was incorporated by the United States, but because of these treaty relations, and because of the importance of that route to the United States.

Q. Now give us the synopsis of your permanent contract.—A. As I said before, these amounts can not be correctly defined until these various questions are settled. (Mr. Hitchcock here read the synopsis, and the committee directed that it be not printed but placed on the files of the committee.)

By Senator EDMUNDS:

Q. What is the actual top-working estimate of the engineers on their final revision; what amount of actual cash, it being ready in hand, will that canal cost?—A. I will state that as definitely as I am able. Our own engineer, Mr. Menocal, makes a full and final estimate, as in his judgment absolutely sufficient to build the canal, $65,000,000. The advisory board of engineers, which we called in to review those plans, and whom we told "we have not called you to approve these plans, but we call upon you to find all the fault you possibly can; that is your business, and we want you particularly to review these figures"—they carried that estimate up from $65,000,000 to $80,000,000. They also added $7,000,000 for the following reason: They said, "You have a peculiar country there. It is a volcanic country. It is not actively so now, but it has been in years past, and when you build these dams you do not know how many crevices, as the water rises, it may find to go through; and therefore you do not know how many leaks you will have to stop; and, while we do not really believe it will cost you that, it may possibly files of the committee directed that it be not printed but placed on the cost you a few million dollars; so we will add $7,000,000 for that item." That carried it up to $87,000,000.

Q. They allowed a certain amount for contingencies in the ordinary way, and then, as a special contingent fund in view of unforeseen possibilities, they added $7,000,000?—A. Yes. So that the actual construction of the canal, according to the advisory board, would cost $87,000,000. Then of course there would be some expenses of administration. I have always said that the lowest amount that should be fixed as the probable actual economic cost of that canal would be $100,000,000. I have never had any other opinion.

Q. Who were the gentlemen who composed the advisory board of engineers?—A. The advisory board was, first, Mr. John Bogart, as chairman, who was the chief engineer of the Erie Canal system. The others were Mr. Wellington, who is an expert engineer and has had a great deal to do in advising about the construction of large aqueduct and other works in this country; Mr. Myers, who is a very prominent railway engineer, and who lives, I believe, at Richmond, and has constructed a great many railway lines; Mr. Charles T. Harvey, who was the constructing engineer of the Saulte Ste. Marie Canal, and Prof. H. A. Hitchcock, the professor of civil engineering in the Thayer school of engineering at Dartmouth College. That was the advisory board.

Q. Would it be possible for your company, in making this permanent contract, to insert in it a clause that if the United States should at any time before the completion of the work, wish to take the things off the hands of the Construction Company, advance money itself, and thus save the enormous difference between actual cost and outstanding obligations and stock, that then the contract should terminate right where it was and be settled up, and its further execution, so far as getting such a great amount of bonds in excess of the actual cash to be used, should stop? By that I do not mean that the Construction Company should stop doing the work and being paid for it in cash, or any adjustment that should be made, but whether you could manage with them to have the door left open for the United States to step in and help you all out in some suitable way, so as to save this enormous amount of outstanding obligations at the end.—A. I have no doubt but what such an arrangement could be made, and I will say very frankly that I think I represent a dominant interest—a dominant body of men in this canal, who, while they expect to realize something from it, yet their desire is so strong for the canal that there will be no personal consideration in the way of the arrangement that you suggest, and I should very decidedly favor it. They are not a selfish body of men. You take men like Frederick Billings, Judge Daly, Mr. Fairbanks, Mr. Darling, and all those gentlemen, and first of all they want the canal built.

Q. I hope, Mr. Hitchcock, and I have no doubt that both my colleagues and doubtless the whole committee will agree with me in that hope earnestly, that your company which Congress has chartered, if you are compelled to make definite and final arrangements before any judgment of Congress, in view of the present situation, can be taken definitely one way or the other, that you will have a clause inserted which shall enable you, justly and legally to the Construction Company, to stop this enormous waste of obligations in such a way that the United States may come to your assistance.—A. I should favor that very decidedly.

By Senator PAYNE:

Q. Is it a part of your obligation under your charter to report annually?—A. Yes; and I have submitted already a copy of our annual report.

By Senator EDUMUNDS:

Q. Have you any copies of the concession of Nicaragua and Costa Rica?—A. I have brought over for you everything I thought you might possibly want. The concessions are out of print, but I have brought over a copy of each of them; also a report of the consulting engineers and a report of the final location by Chief Engineer Menocal.

[The copies of the concessions, etc., were placed on file.]

Committee adjourned.

SENATE OF THE UNITED STATES,
COMMITTEE ON FOREIGN RELATIONS,
Saturday, June 28, 1890.

The committee met at 10.30 a. m. Present, Senators Sherman (chairman), Edmunds, Frye, Evarts, Dolph, and Payne.

There were also present, at the request of the committee, Hiram Hitchcock, president of the Maritime Canal Company of Nicaraugua, and Warner Miller, president, and Alexander T. Mason, attorney of the Nicaragua Canal Construction Company.

STATEMENT OF HIRAM HITCHCOCK—Continued.

By the CHAIRMAN:

Q. Mr. Hitchcock, it is presumed you know the situation of the matter before us. We want to get from you the precise financial status of the Maritime Canal Company and also of the Construction Company, and we would like to have you make your statement in your own way. We want to know the precise amount of the obligations you are under either for improvements made or for expenses already incurred, including obligations now existing or that are accruing, so as to get at the exact present condition of the two companies. We have your former statement here before us, and you need not go over that unless it is necessary to repeat some portion of it.—A. Allow me to say that in my previous statement I answered such questions as were asked, and made some further remarks with reference to this matter. I did not go into all of the details of the transactions relating to the concessions, as I took it for granted that you gentlemen were fully conversant with nearly all those particulars. In order to answer your question clearly, I will go back to the Nicaragua Canal Association which obtained the two concessions from the Governments of Nicaragua and Costa Rica, respectively. Under those concessions the Canal Association was obliged to form a construction company and also to take measures for the formation of the Maritime Canal Company of Nicaragua. It immediately formed the Construction Company, which was incorporated three years ago this month.

Q. That is the Construction Company?—A. The present Construction Company, to which company the concessions were transferred by the association. Under the terms of the Nicaragua concession the Nicaraguan Government is to receive 6 per cent. of the stock, as we believe, of the company, but as they believe 6 per cent. of all the secu-

rities issued by the company. That question remains unsettled, a construction of the clause referring to that matter not having been agreed upon. The Costa Rican concession calls for a million and a half, or 1½ per cent. of the stock of the Maritime Company. The Maritime Company has not as yet issued any of its stock to those Governments. The association itself, under the terms of the concession from Nicaragua, is entitled to the same compensation which the Government of Nicaragua receives; that is, 6 per cent. of the securities of the Maritime Company.

Q. Repeat that sentence.—A. I say that under the concession the association itself, that is, the Nicaragua Canal Association——

Q. The old association?—A. The old association under the fifty-first article was to receive from the Maritime Company 6 per cent. of the stock and bonds of the company to be formed.

By Senator EDMUNDS:

Q. The fifty-first article, do you say?—A. The fifty-first article. Now, those two concessions, as I stated, were disposed of to the Construction Company in order that the work might go on, and we were obliged under the concessions to form a construction company, and we had to wait a long time before we could form, as we believed properly, the Maritime Company. We waited for this Congressional charter and organized under it. Now the Maritime Company was formed——

Q. The old association was merged in the Maritime Company?—A. The old association was dissolved; the Maritime Company was formed and purchased of the Construction Company all its right, title, and interest in and to the two concessions—for which it agreed to pay $12,000,000 stock of the Maritime Company. The stock has not been issued; and the stock has not been issued to those two Governments. We have not issued the $12,000,000 to the Construction Company, although we have agreed so to do. We left it to be delivered at their demand, and the obligation still remains to deliver on call to the president of the Construction Company this $12,000,000 Maritime Company stock that is agreed to be paid for these concessions.

By the CHAIRMAN:

Q. One-half of which goes to the Nicaraguan Government and the other half to the Construction Company?—A. No, that is entirely different. Six per cent. is to go to Nicaragua, and 1½ per cent. to Costa Rica, but the Maritime Company pays to the Construction Company for those two concessions, with all the rights, privileges, and franchises thereunder, $12,000,000 stock.

Q. Does that $12,000,000 cover the amount that goes to Nicaragua and Costa Rica?—A. No, sir; that is entirely independent.

Q. Then you are under obligations to issue $12,000,000 to the Construction Company, $6,000,000 to Nicaragua, and $1,500,000 to Costa Rica?—A. Yes.

Q. Nineteen million five hundred thousand dollars?—A. Yes.

Q. Now, what are you to receive for that?—A. That was regarded as the just value of the concessions which the Construction Company had purchased of the association. That of course includes the $6,000,000 stock which the association is entitled to under the terms of the concession, and any right they might have to 6 per cent. of bonds and 6 per cent. of any future increase of capital stock. So the Construction Company, for taking hold of this enterprise and practically carrying it on, receive an additional $6,000,000 of stock; but you gentlemen will

remember that the Costa Rican concession was subsequent to that from Nicaragua, and has of course very great value. Without it the canal could not be built as at present located.

Q. Then, if I understand you, the answer to my question is, that you are under obligations to issue in the aggregate $12,000,000 stock to the Construction Company, $6,000,000 to Nicaragua, and $1,500,000 to Costa Rica?—A. Yes.

By Senator EDMUNDS:

Q. There would be no additional claim by the construction company?—A. No, sir. Whatever the association was entitled to receive under the 51st article of the concession, which was 6 per cent. of the stocks and bonds, was conveyed by it to the construction company, and subsequently by the construction company to the Maritime Canal Company of Nicaragua.

Q. But you have not issued that stock yet?—A. No, sir.

Q. Who compose the association that got this concession of Mr. Menocal?—A. The association was originally formed of Frederick Billings, Chief Justice Daly, Admiral Ammen, Commander Taylor, Horace L. Hotchkiss, Francis A. Stout, Commander Crowninshield, Engineer Menocal, and myself. That was the original meeting, but the number was afterwards increased and included perhaps one hundred and twenty-five, possibly one hundred and fifty gentlemen.

Q. Did that association have a corporate existence?—A. No, sir; it was simply a business association for the purpose of obtaining concessions.

Q. Did it keep books, minutes of its meetings, etc.?—A. It kept minutes of its meetings.

Q. Where are they, are they in your possession?—A. They are not in my possession. The association some time ago went out of existence.

Q. That association turned itself into the Construction Company?—A. No, sir; it held its organization intact. Its members aided in forming the Construction Company.

Q. When was the Construction Company formed?—A. It was formed nearly three years ago this month.

Q. Before the passage of the act to incorporate the Maritime Canal Company?—A. Yes. The Construction Company commenced work in December, 1887.

Q. Who composed the Construction Company?—A. It was composed mainly of the gentlemen of the association.

Q. Give the names of everybody you can remember.—A. There was Mr. Billings, Governor Fairbanks, of Vermont, who was succeeded by his brother, Col. Franklin Fairbanks, Judge Daly, Mr. Stout, Mr. Hotchkiss, Mr. Thompson, of the First National Bank of New York, Mr. Darling, Mr. James Roosevelt, Mr. Robert Garrett and T. Harrison Garrett, of Baltimore, Robert A. Lancaster, of Richmond, Joseph Bryan, of Richmond, Mr. Cohen, of Savannah, Mr. Aldige, of New Orleans, Mr. Anderson, of Cincinnati, and I presume I could think of a good many more of them.

By the CHAIRMAN:

Q. Which one of the Andersons?—A. I think, William P. Anderson.

By Senator EDMUNDS:

Q. When was this transfer from the original association to the Construction Company made? I understood you to say that the conces-

sions were first transferred to the Construction Company by the association.—A. Yes.

Q. Now, when was that?—A. It was in September, 1887.

Q. Was that in writing?—A. That is my impression, yes.

Q. Have you got the books here which show the entries and engagements, etc., on which the transfer from Menocal and his associates to the Construction Company was made?—A. Not to my knowledge.

Q. Are you a member of the Construction Company?—A. I am a member of the Construction Company, yes.

Q. You are not an officer?—A. No, sir. I left New Hampshire yesterday morning and do not know what papers have been brought here. As I said, all the books and papers of the association are in the custody of the late secretary.

Q. Yes, the books and papers of the Maritime Company and the Construction Company are in the possession of the officers of the company?—A. Yes, sir.

Q. You being president of one company and Mr. Miller of the other?—A. Yes.

Q. Mr. Miller, have you the books and papers showing the transfer of Mr. Menocal's rights?

Hon. WARNER MILLER. We have the papers all here.

Q. Are you willing to produce them so that we can see exactly what the transaction was?—A. Mr. Mason will produce all the papers.

Q. I suppose the papers will show exactly what this transfer was?—A. Yes.

Q. That, you say, Mr. Hitchcock, was in 1887?

Mr. HITCHCOCK. September, 1887.

Q. Now, when was the first engagement made between the Maritime Company and the Construction Company?—A. The first engagement between the Maritime and Construction Company was made very near, in fact, immediately after the organization of the Maritime Company, which was in May of last year, 1889.

Q. Were those engagements in writing, by contract, or by correspondence?—A. They were in writing by correspondence.

Q. Are all the undertakings between the two companies in writing?—A. Yes.

Q. There are no private contracts or correspondence, then, that do not appear in your books and papers?—A. Not at all.

Q. I suppose the Construction Company has its separate books; these entries will appear in two sets of books?—A. Yes.

Q. What was the nature of the engagement you made with the Construction Company?—A. The same that I mentioned the other day.

Q. Was there any other engagement between the two companies except what you stated the other day?—A. As I stated to the committee then, the two companies had practically made an agreement, but it was not signed and it could not be signed for the reason I gave; and that is, we could not tell how many bonds to put into that contract, and the matter had been held under advisement for that reason.

Q. Where is the engagement to which you referred, in answer to Mr. Sherman, as an obligation on the part of the Maritime Company to issue nineteen millions of stock. We can see as far as the concessions go how much goes to the Governments of Nicaragua and Costa Rica, but in respect of what you say you give the Construction Company of your stock?—A. That was a purchase by the Maritime Company from the Construction Company of the two concessions which the Con-

struction Company then owned under its purchase from the association.

Q. Yes, it was a purchase of a paper transaction?—A. Yes.

Q. Did it precede or follow this temporary working contract that you showed us the other day?—A. It was the same day, if I remember right.

Q. Did you say anything about that to us the other day when you were here?—A. No, sir; not at all.

Q. Did you say it was in writing?—A. Yes, sir; it was in writing.

Q. And was put in writing at that time, I suppose?—A. Yes. That was a purchase by the Maritime Company from the Construction Company.

Q. Does that appear by the books of your corporation?—A. It does.

Q. And I suppose in the books of the Construction Company?—A. Yes.

Q. Well, it is rather unfortunate that so important an item was left out the other day.—A. It is unfortunate. It did not occur to me, and I was not asked a question about it. It was a purchase of those concessions by the Maritime Company of the Construction Company.

Q. Yes, but it was purchased, as you say, in round numbers, for $12,000,000?—A. Yes.

Q. And you had engaged to pay it in stock?—A. Yes, sir.

Q. And I asked you how much stock you had out and you said 10,145 shares?—A. Yes.

Q. And here was an obligation of the company you did not disclose, amounting to an engagement to deliver $12,000,000 stock paid up to the construction company?—A. That is true, but the stock had not been issued, and I was asked how much was issued, and confined myself to that question. I had no desire to conceal anything.

Q. You were coming on here so rapidly to-day I suppose you were not able to bring the books of your company?

Mr. ALEX T. MASON. I brought them with me, and have them here (producing them).

Q. Then let us see the entries as to the purchase of these concessions. This book you now produce is the record of the meetings of the executive committee of the Maritime Canal Company?—A. Yes, sir.

Q. That is the company chartered by Congress?—A. Yes, sir.

Q. Now this begins on the 24th of May. That is the same date you refer to. Now come to that part of it. I will just read this. It shows a meeting on the 24th of May. Present, Messrs. Hitchcock, Mason, Hotchkiss, and Daly, of the executive committee. In the absence of Mr. Billings, Mr. Hitchcock was appointed chairman.

The Secretary then read a communication received from the Nicaragua Canal Construction Company offering to assign to the Maritime Canal Company of Nicaragua for valuable considerations the concessions of the Governments of Nicaragua and Costa Rica, which were assigned to said Construction Company by the Nicaragua Canal Association. Mr. A. C. Cheney and Mr. H. C. Taylor attended the meeting of the committee to present the views of the Construction Company as to the consideration which should be paid by the Maritime Canal Company for the proposed assignment of the concessions. After some discussion the representatives of the Construction Company withdrew for consultation, and subsequently presented the proposition of their company as finally agreed upon and embodied in the following resolution:

Resolved, That the President be and he hereby is authorized and directed to notify the Maritime Canal Company of Nicaragua that this company will transfer and assign to the said Maritime Canal Company the two contracts or concessions granted by the Republics of Nicaragua and Costa Rica, respectively, together with all the rights, powers, privileges, property, benefits, advantages, and franchises of every nature and kind whatsoever which this company as assignee of the Nicaragua Canal Association has in, to, by or under said concessions, and also all the data in its pos-

session relating to surveys, explorations, reconnaissances, and estimates, which are now in its possession, for the sum of 12,000,000 dollars in full paid up shares of the capital stock of the Maritime Canal Company of Nicaragua.

On motion of Mr. Daly, seconded by Mr. Hitchcock, the following resolutions were unanimously adopted:

Resolved, That the proposition of the Nicaragua Canal Construction Company for the transfer and assignment of the Nicaragua and Costa Rica concessions to this company be and the same is hereby accepted upon the terms and conditions therein set forth: *Provided, however*, That it is understood and agreed that the concession granted by the Republic of Costa Rica is accepted by this company upon the condition that nothing therein contained shall be construed to affect the sovereignty or proprietary interests of the Republic of Nicaragua so far as the same may have been established by the treaty of April 15, 1858, between the Governments of Nicaragua and Costa Rica; *And be it further*

Resolved, That the president and secretary are hereby authorized to execute, under the corporate seal of this company, such agreements as may be necessary to complete the transfer and assignment of said concession upon the terms and conditions aforesaid, and also to deliver over to said the Nicaragua Canal Construction Company, upon receiving the proper deeds of transfer, ($12,000,000) twelve millions dollars in full paid shares of the capital stock of this company.

That goes to the temporary contract or offer to do the work of which we had copies before. Now, Mr. Hitchcock, did you execute the deeds that were mentioned to be executed—papers of transfer?

Mr. HITCHCOCK. Yes.

Q. As separate documents?—A. Yes.

Q. This being merely a minute of the meeting, of what was proposed and what was accepted?—A. Yes.

Q. Now then, where are those documents?—A. They are here.

Q. Just let us see the one by which you have engaged to pay. I want to see when you are to issue the stock absolutely. Were you to issue this stock when they delivered the deed containing the concessions?—A. Yes, the agreement so states, but in view of the questions with reference to issuing stock, as I said before, the understanding was that the stock should not be issued to the company except on the demand of the president of the Construction Company.

Q. Was that understanding in writing?—A. No, sir; it was a verbal understanding.

Q. But they actually delivered to you the deed transferring the concessions?—A. Yes.

Q. And left you under an obligation not performed?—A. Yes.

Q. On the face of it, you have delivered the stock then and there, I suppose; that is what the resolution says?—A. That might be the construction, I suppose; they have never asked for it.

Q. You were one of the association, you say; how much did the association pay for these same concessions?—A. I can not give you the exact figures.

Q. Well, in round numbers?—A. Several hundred thousand dollars.

Q. Well, one, two, or three?—A. I should think, for both concessions, something like half a million dollars, including all the expenses connected with them

Q. What is the character of those expenses, name them?—A. They were cash advances. For instance there was $100,000 advanced to the Government of Nicaragua.

Q. That was the deposit required?—A. Yes.

Q. Well that is $100,000?—A. Various expenses of organization, some expenses of preliminary surveys and things of that sort.

Q. Then you transferred them, as you said before, to the Canal Construction Company?—A. To the Construction Company, yes.

Q. How much did they pay you for those concessions?

By the CHAIRMAN.

Q. Let me ask before you answer that—this Construction Company was formed before the Maritime Company, was it?—A. Yes, two years before.

Q. Is that the same Construction Company that is now in existence?—A. The same now in existence.

By Senator EDMUNDS:

Q. Under a Colorado charter?—A. Yes. I can not tell you all the Construction Company paid, but it paid more than the association paid.

Q. In what form did it pay it?—A. They paid it in stock, I think.

Q. Stock in the Construction Company?—A. In the Construction Company; yes sir.

Q. Did they pay any cash?

Mr. MASON. There was no cash payment

Q. When did that transaction take place?—A. I think in August, 1887.

Q. Immediately after the Colorado charter?

Mr. HITCHCOCK. The Colorado charter was in June, and this was August following.

Q. Well, the Construction Company books, I suppose, show just how much was paid?—A. Yes, sir.

Q. And what in?—A. And what in.

Q. You understand it to be something more; were you one of the sellers?—A. Yes, and the payment was in stock. Certain advances were made, but the payment was in stock.

Q. How much stock?—A. Eleven million nine hundred and ninety-eight thousand dollars. It was paid by the issue of the Construction Company stock.

Q. Issued to the owners of the concession?—A. Yes.

Q. Being the gentlemen who you have named and others of the same sort that you have not named?—A. Yes, sir. What I meant by money advances is that the Construction Company had made advances from time to time. When it was finally settled——

Q. I think you stated before that the Construction Company was composed of substantially the same gentlemen?—A. Yes.

Q. The Maritime Company, as far as the people composing it are concerned, is substantially the same company?—A. Yes.

Q. And the concessions having been obtained for half a million dollars the holders turned them over to the company formed under the Colorado charter for an issue to them of $11,998,000 in stock; how was that precise sum computed? It is an odd sum, being so near to $12,000,000?

Mr. MASON. It was computed in this way: The capitalization of the Construction Company was $12,000,000, of which enough was subscribed for to effect the organization of the corporation, and the balance was issued in payment of this charge.

Q. So that what was issued in the form of a corporation and what was turned over for these concessions made the charter amount of the capital?—A. Yes.

Mr. MILLER. I would like to have Mr. Mason, who has been the attorney all the way through, make a concise and plain statement from beginning to end so that it will appear just what the transactions were.

Senator EDMUNDS. Yes. I wanted to be sure that at this time I had not forgotten anything Mr. Hitchcock had said, so as not to send for him again. I understand this transaction makes the association the

owner of the whole stock of the Construction Company, being the same persons.

Mr. HITCHCOCK. I join with Senator Miller in the request he makes.

By the CHAIRMAN:

Q. And the $12,000,000 issued by the Maritime Company to the Construction Company is practically the same amount, is it not?

Mr. HITCHCOCK. Yes.

Q. The stock of the Maritime Company was issued to the holders of the concessions?—A. The holders of the concessions are entitled to six millions or 6 per cent.

By Senator EDMUNDS:

Q. They sold out all that for $12,000,000 in round numbers. The Construction Company, therefore, have stock of the Maritime Canal Company, chartered by Congress, for $12,000,000, you all, in substance, being the same body of gentlemen?—A. Practically the parties owning the concessions form these two companies.

Senator EVARTS. It never became, as I understand, a matter of transaction and substance until it came to the issue of a certain number of shares in the Maritime Company; is not that so?

Senator EDMUNDS. Yes.

The CHAIRMAN. The Maritime Company paid $12,000,000 of their stock for concessions and expenses incurred before that time.

Senator EDMUNDS. Agreed to pay it, and the Construction Company paid $12,000,000 stock in round numbers to the gentlemen who formed the association, and all the same parties all the way through. Is there anything else, Mr. Hitchcock of any kind as to the obligations of the Maritime Canal Company in respect to these concessions and the work that you have not stated on the other occasion and now?

Mr. HITCHCOCK. No, sir; I do not recall any now.

Q. Then this, in round numbers, now represents the whole and every kind of engagement and liability that the Maritime Canal Company is under?—A. Yes.

Q. And you have described all sort of liabilities?—A. Yes, and I want simply to assure you that there was no intent of reserving anything on my part the other day, but the question did not happen to come up in that form and this was a purchase and sale between the two companies.

STATEMENT OF ALEXANDER T. MASON.

The Nicaragua Canal Association was formally organized on the 3d of December, 1886, by Messrs. Daly, Stout, Hotchkiss, Taylor, Billings, Crowninshield, Hitchcock, Miller, and Menocal, for the purpose of securing from the Government of Nicaragua a concession or grant with all the rights and privileges required for the construction and operation of a ship canal within the limits of that country connecting the Caribbean Sea with the Pacific Ocean, together with all works accessory to or beneficial in the construction or operation of said canal. Articles of agreement were signed by the various members, and Mr. Francis A. Stout was elected president, and Mr. J. W. Miller, secretary. Negotiations were conducted in Nicaragua on behalf of the Nicaragua Canal Association by Mr. A. G. Menocal, and resulted in his obtaining the canal concession now in force. This concession was duly ratified by the Nicaraguan Congress, and was subsequently, on the 24th of April, 1887, approved by the president of the Republic, and on the same day accepted by Mr. Menocal on behalf of the association. The objects for which the association was formed having been virtually accomplished when the concession was obtained, it became necessary for the purpose of complying with the terms and conditions therein contained, and in order to carry on the work of completing the final axial surveys for the location of the canal, to organize a new corporation. Accordingly, on the 10th day of June, 1887, the Nicaragua Canal Construction Company was duly incorporated under the general laws of the State of Colorado with a capital fixed at $12,000,000.

By the CHAIRMAN:

Q. Can you leave with us a copy of that document (referring to a printed copy of the certificate of incorporation of the Nicaragua Canal Construction Company)?—A. Yes; but I think you have one already in your possession.

On the 12th day of August, 1887, the Nicaragua Canal Association sold, assigned, transferred, and delivered to the Nicaragua Canal Construction Company, in consideration of the sum of $11,998,000, in the capital stock of the said construction company, all the rights, powers, privileges, property, benefits, advantages, and franchises of every nature and kind whatsoever which the said association had in, to, by or under the said concession granted by the Republic of Nicaragua, excepting, however, the right to organize the Maritime Canal Company of Nicaragua and the right of representation in the first board of directors thereof. This assignment and transfer included and covered the 6 per cent. of shares, bonds, certificates, and other securities of the said Maritime Canal Company of Nicaragua, to which the association was entitled under the fifty-first article of the concession.

By Senator FRYE:

Q. One moment, please. Did that transfer include the Costa Rican concession as well as that from Nicaragua?—A. No, sir; for at that time the concession from Costa Rica had not been obtained.

After the above transfer had been completed, and the consideration therefor duly paid, the Nicaragua Canal Association turned back into the treasury of the Construction Company six millions of the stock which it had received as a gift for the purpose of enabling the Construction Company to raise, by the sale thereof, the funds that were needed to carry on the preliminary work under the concession, and to complete the final surveys and the location of the canal.

By Senator PAYNE:

Q. This was a donation?—A. It was a voluntary donation on the part of the association, and the proceeds of this stock, which has been sold by the Construction Company from time to time, have been devoted to carrying on the work connected with the enterprise.

At the time the sale and transfer above referred to was made, none of the members of the association were members of the Construction Company, but of course they became stockholders in the new corporation as soon as the stock delivered in payment for the concession was distributed. The Construction Company having become the owner of the Nicaraguan concession at once commenced operations on the line of the canal and undertook the work required to be done under article 47 of the concession within the period therein named. Up to this time the association had supposed that the concession granted by the Republic of Nicaragua conveyed an absolute title to the entire route of the canal, but no sooner had the engineering expedition, sent out by the Construction Company, landed at Greytown than the Republic of Costa Rica filed its protest against the construction of a canal over the proposed route without its consent. This protest alleged that, under the treaty of limits of April, 1858, entered into between the respective Governments of Nicaragua and Costa Rica, the latter Republic was the owner of certain rights in and to the port of Greytown and the river San Juan of which it could not be divested by the Republic of Nicaragua without its consent. The questions arising as to the proper construction to be given to the said treaty were referred by both Governments to President Cleveland as arbitrator, and his award, which was rendered on the 22d day of March, 1888, virtually decided in favor of Costa Rica. It then became necessary for the association, in order to remove all difficulties which had arisen or might thereafter arise in regard to damage or injury which might be caused to the natural rights of Costa Rica in the construction of the canal, to obtain from that Republic a contract of some kind. Negotiations were accordingly started, and resulted in what is known as the Zeledon-Menocal Concession, which was duly ratified and approved by the President of Costa Rica on the 9th day of August, 1888.

By Senator EDMUNDS:

Q. That being the concession we have a print of and which is dated July 31, 1888?—A. Yes, sir; it was approved August 9, 1888.

Q. Yes; that was the final approval by the President.—A. Yes; this concession, as I have already stated, was obtained by the Nicaragua Canal Association in order to perfect its original title to the route of the canal. As the Nicaraguan concession had already been transferred to the Construction Company, the Nicaragua Canal Association, on the 24th day of May, 1889, also transferred the Costa Rican concession to the said Construction Company for the good and valuable consideration already received by it under the contract of August 12, 1887, and for an additional cash consideration to cover the expenses actually incurred by the association in obtaining the new concession. The Construction

Company thus became the absolute owner of both concessions, subject to the terms and conditions therein contained. This was the condition of affairs at the time the Maritime Canal Company of Nicaragua was duly organized under the charter granted by the United States Government.

On the 24th day of May, 1889, the Nicaragua Canal Construction Company assigned, transferred, and delivered to the Maritime Canal Company of Nicaragua the said two concessions granted by the Republics of Nicaragua and Costa Rica, respectively, together with all and singular the rights, powers, privileges, property, benefits, advantages, and franchises of every nature and kind whatsoever which the said Construction Company as assignee of the Nicaragua Canal Association had in, to, by, or under the said concessions. This transfer was made in consideration of the sum of $12,000,000 in full paid-up shares of the capital stock of the Maritime Canal Company of Nicaragua of the par value of $100 each. The Construction Company, prior to this time, had completed the final surveys, and was ready to commence in Nicaragua the preliminary work of installation. Owing to the existence of certain difficulties between the Republic of Nicaragua and the company, which had been caused by the granting of the Costa Rican concession, it was deemed of vital importance that work on the canal should be commenced at the earliest possible date, so as to satisfy the Nicaraguan Government of absolute good faith on the part of the company. It was decided, therefore, that work should be commenced at Greytown, if possible, during the first week of June, 1889, and, as the time was too short within which to prepare and execute a permanent contract between the two companies, the preliminary contract which Mr. Hitchcock has already submitted to you on a former occasion, was entered into on May 24, 1889. On the strength of this contract the Construction Company organized an expedition which was immediately dispatched to San Juan del Norte.

By Senator PAYNE:

Q. That was in June?—A. Yes, sir; the expedition commenced work on June 3.

By Senator MORGAN:

Q. Sailed from here on that date?—A. No, sir; arrived down there on June 3. Immediately after the expedition had sailed the board of directors of both companies met and appointed a joint committee, consisting of three members from each board, to consider the question of a permanent contract between the two companies and to report to the respective boards such a proposed document as they might be able to agree upon. This joint committee met two or three times a week for three or four months until a contract was unanimously agreed upon. It was reported by the committee to both boards and was adopted and approved by both companies, and their respective officers were duly authorized to execute the same.

By Senator EDMUNDS:

Q. Can you turn to the entries of that ratification and the votes of the boards of directors on that point?—A. Yes, sir [examining book]. Shall I read it?

Q. If you please; and give the date.—A. The date is January 2, 1890.

Q. Which company's books are you reading from?—A. The minutes of the board of directors of the Maritime Canal Company of Nicaragua.

Q. Now read it.—A. (Reading:) "At the request of the Chairman of

the joint committee upon the contract Mr. Mason presented the draft of a contract which had been agreed upon in committee and directed to be presented to the respective companies as the committee's report. The contract submitted was read to the board and ordered on file. Mr. Fairbanks moved that the report of the committee be accepted and the contract, as read, be approved, and that the president and secretary of the company be and hereby are authorized and directed to properly execute the same when the Construction Company shall be prepared to do the same on its own behalf. The motion was seconded by Admiral Ammen and on vote unanimously adopted."

Q. Now turn to the Construction Company and give us their vote?

By Senator PAYNE:

Q. Was that in January?—A. January 2, 1890. [Reading from book containing the minutes of the board of directors of the Nicaragua Canal Construction Company.] "*Resolved*, That the contract between the Maritime Canal Company of Nicaragua and the Nicaragua Canal Construction Company as presented and read to the board, be and the same is hereby approved and that the officers of this company are hereby authorized and directed to execute the same and affix the seal of the company thereto." The resolution was passed unanimously.

By Senator EDMUNDS:

Q. That is the 3d of January, 1890—A. The day after the action taken by the Maritime Canal Company of Nicaragua.

By the CHAIRMAN:

Q. Is not that contract embodied in the minutes?—A. No, sir; it was filed with the secretary of each company.

Q. Have the contracts ever been recorded anywhere or simply placed on your files?—A. Each company has a copy on file.

By Senator EDMUNDS:

Q. At the meeting on the 2nd of January of the Maritime Canal Company I read here [reading from record book]: "Present, Messrs. Hitchcock, Daly, Hotchkiss, Mason, Ammen, Stout, Darling, and Fairbanks." That was the meeting, was it not?—A. Yes, sir.

Q. Now at the meeting on the same day of the Construction Company were present Messrs. A. C. Cheney (in the chair), J. L. Macauley, R. Sturgis, H. R. Hoyt, J. W. Miller, and A. F. Hedges. They were the directors of the Construction Company, and these other gentlemen were the directors of the Maritime Canal Company?—A. Yes, sir. The board of directors of the Construction Company met on the 2d to receive the report of the committee, but did not take definite action on the same until the meeting on January 3, 1890.

By Senator DOLPH.

Q. Have both of these companies by-laws?—A. Yes, sir.

Q. Are they there before you?—A. They are in the minutes.

Q. Will you refer to the provision in the by-laws of each company with regard to meetings, showing when the regular meetings are and how special meetings are called?

By Senator EDMUNDS:

Q. Which contract is referred to in those two votes?—A. The permanent contract. As I stated, the joint committee which drew it was appointed shortly after the preliminary contract was signed.

Q. And that permanent contract is the same one, then, of which Mr.

Hitchcock the other day gave us a synopsis?—A. I presume that it is the same one.

By Senator FRYE:

Q. Are they at work under the preliminary contract now?

Mr. MASON. The final contract is practically in effect. It has virtually been agreed upon by both boards.

By the CHAIRMAN:

Q. Has it been written out and signed?—A. It has never been signed by the officers, but the minutes of the Maritime Canal Company show that the officers of that company were authorized and directed to execute it as soon as the construction company was prepared to do the same. The Construction Company has not executed it up to the present time.

By Senator DOLPH:

Q. Now, Mr. Mason, will you read the conditions of your by-laws about meetings?—A. Yes, sir. Article 5 of the by-laws of the Maritime Canal Company of Nicaragua provides:

> Regular meetings of the board of directors shall be held on the first Thursday of each month. Special meetings of the directors may be called at any time by the president, or, in his absence, by the vice-president, by causing a notice of the same to be sent by mail or telegraph to each director at least one day in advance of such meeting, and a special meeting of the board shall be called by the president at any time, upon the written request of three directors.

Q. Is there anything providing that a quorum shall be necessary or what shall constitute a quorum?—A. Yes, sir. The same article provides that at any meeting of the board of directors the presence of a majority of the members of the board shall constitute a quorum——

Q. At all meetings?—A. Yes, sir.

Q. Now read the provisions of the other company. Which company is that?—A. I have just read from the by-laws of the Maritime Company.

Q. Now state the same as to the Construction Company.—A. Article 6 of the by-laws reads as follows:

> ARTICLE VI. Regular meetings of the board of directors shall be held on the third Thursday of each month.
>
> Special meetings of the directors may be called at any time by the president, or in his absence by the vice-president, by causing a notice of the same to be sent by mail or telegraph to each director at least one day in advance of said meeting, and a special meeting of the board shall be called by the president at any time upon the written request of three directors.
>
> The meetings of the board of directors shall be held at the principal office of the company in the City of New York, or at such other place as the board of directors may from time to time direct.
>
> Any meeting of the board of directors at which a quorum is not present may be adjourned from time to time by those present as they may direct, and such adjournment shall be deemed to continue in session the meeting so adjourned.
>
> The presence of a majority of the members of the board of directors shall constitute a quorum.

Q. Was either of the meetings at which this contract was agreed to a regular meeting?—A. I think so. I know the Maritime Canal Company's was.

Q. That was a regular meeting?—A. Yes, sir.

Q. And the other must have been a special meeting?—A. Yes, sir.

Q. Was there a majority of the directors present at both meetings?—A. Yes, sir.

Q. Was notice given as the by-laws require of a special meeting of the Construction Company?—A. Yes, sir.

Q. Is there any record there or statement of that.

The CHAIRMAN. I suppose it gives the names of the persons present?

Mr. MASON. It gives the names of the persons present.

By Senator DOLPH:

Q. The entry does not show that due service was given?—A. No, sir, it simply says at a regular meeting. We are not called upon really, under the by-laws, to give notice of a regular meeting.

Q. Do you know why the Construction Company has not executed this contract?—A. I do not know whether they have finally fixed upon——

Q. Are there any blanks left in the contract as to the amount of compensation or stock?—A. Not as reported by the committee, no sir.

Q. Nor as agreed to by the company.—A. Nor as agreed to by the company.

By Senator EDMUNDS:

Q. Well, as I understand from these minutes the draught was presented to these boards of directors?—A. Yes, sir.

Q. Now, did that draught, which the directors at the meeting directed their president to execute, contain any imperfection or blank or other thing to be filled or determined upon?—A. There may have been something in regard to the denomination of the bonds or the rate of interest. There were seven draughts made of the contract before the final report was submitted, and I should have to refer to the final draught.

Q. Have you got the final draught here?—A. Yes, sir. My recollection is that the amounts were all filled in. I have my draught of it.

Q. Is that the final draught?—A. Yes, sir, the final draught.

Q. It was drawn up in duplicate I suppose?—A. Yes, sir.

Q. And you have one of the duplicates?—A. Yes; that is to say, this draught I have here is the original draught from which the two copies which are on file with the two companies were made and is identical.

Q. Is this the paper which was submitted to the board of directors?—A. This is an exact copy of the paper.

Q. Yes, but is that made from the paper submitted to the board or is the paper you have here—— A. The two papers which the boards approved were really made from this, this being the draught copy.

Q. I merely wanted to get at the precedence of the order. This, then, is the draught from which the duplicate contracts, ready to be signed, as you understand at any rate, then presented were made?—A. Yes, sir.

Q. So that this paper now in your hands is identical with those duplicates?—A. Yes, sir.

Q. Now, see if there is any blank there?—A. (Examining paper.) Here is a blank in the date——

By Senator PAYNE:

Q. Those papers were prepared by you, I suppose?—A. Yes, sir. It is the work of the committee, but I acted as the attorney. (Continuing examination of paper.) I do not see any blanks in this copy.

By the CHAIRMAN:

Q. Is that signed by any one at all?—A. This is not signed; no, sir.

By Senator EDMUNDS:

Q. Had you finished making your consecutive statement?—A. I think I have given you all the facts up to the time of the contract.

By the CHAIRMAN:

Q. If there is anything else, now, that bears upon your liabilities or your present condition we would like to have it up to this time. Since that time, under the provisional contract, as I understand, the Construction Company has gone on and done a good deal of work?—A. The Construction Company has been engaged at work since June last. It is practically operating under the permanent contract.

By Senator EVARTS:

Q. That is a very important point. You had agreed by resolutions to a definite contract to be executed by your officers. Now if that rests in abeyance unexecuted, either in form or in substance, it is one thing; but as you now stand, upon that condition of obligations between the companies, your company has allowed the transaction to go on as under the permanent contract, which is different from what it would be if it had been going on merely under the provisional contracts; which is it?—A. Well, I shall have to refer that question to the presidents of the two companies.

By the CHAIRMAN:

Q. Is there any difference in the mode or manner of work or mode of payment between the provisional contract and the permanent contract?—A. Yes; the permanent contract provides for payment in stock and bonds.

By Senator EDMUNDS:

Q. I see here, Mr. Mason, in the fourth head of this contract, which is exactly like the papers laid before the two boards, "that it"—that is the Construction Company—"that it will begin work on this contract on the Nicaragua Canal within thirty days next after the execution of this agreement, and will complete the construction of said canal with its appurtenances and other works and deliver the same to the party of the second part ready for operation on or before October, 1897;" and then goes for other things?—A. Yes, sir.

Q. Now then, if, as you say, this work is now going on under this unsigned duplicate contract that you have described, when does the period of the obligation of the company to begin within thirty days and to end it by 1897 begin to operate?—A. I can only answer that by saying that I understood at the time, and have understood ever since, that when the contract is executed it will be executed *nunc pro tunc*, as of the date it was approved.

Q. But the language is "after the execution of this agreement," which, I take it, means the sign manual of the persons authorized to sign. A. Well, I suppose, strictly speaking, that is so; but the board of directors were unanimous in regard to this contract, and although the act of signing it was delayed for one reason or another, it was virtually understood that when it was executed it would be executed *nunc pro tunc* as of the date it was authorized.

Q. You say it was delayed for one reason or another. Can you give any reason?—A. Personally I know of none.

Q. You are a member of the board?—A. I am a member of the board of directors of the Maritime Canal Company.

Q. Have you any relations with the Construction Company?—A. The firm of which I am a member are the attorneys.

Q. Yes, but you are not an officer of it?—A. No, sir; I am not an officer.

Q. You are not a director?—A. I am not in the board of directors.

By Senator PAYNE:

Q. I would like to ask one question about that $6,000,000 stocks of the association that is retained by them as their personal property; they donated $6,000,000 to the Construction Company, and it remains with them?—A. Yes; it was distributed to the shareholders of the association. The association has since been dissolved.

Q. How much of the $6,000,000 stock donated have they disposed of?—A. I shall have to refer you to Senator Miller.

By Senator EVARTS:

Q. Have any transfers taken place of the $6,000,000 retained by the original association?—A. Whether there have been any transfers of that stock I do not know, but I presume there have. It was originally transferred to the shareholders of the association, but whether they have parted with any portion of it I can not say. The transfer books will show that.

By Senator EDMUNDS:

Q. Are you willing we should have a copy of this paper [the contract] for our use and examination?

Mr. MILLER. We would not like to have it published, but have no objection to leaving it with the committee.

Mr. HITCHCOCK. Mr. Chairman, I would like to say in this connection what I said before, that while the officers of the company are authorized to sign this contract, yet they and the committees of the two companies decided that it was a contract which it might be desirable to submit to the counsel of bankers who propose to take hold of these bonds to see if any change is necessary. In the next place, the questions of duration of the bonds and the fixing of a rate of interest has to be considered, and until those matters are settled it is impossible to fix definitely the sum of bonds and stock to be put into this contract to pay for that work, and that is the reason why the officers have held back from signing this contract, and while, as I stated, it was a contract practically agreed upon, it is an unsigned contract.

By Senator FRYE:

Q. Then the present operations are going on under this contract?—A. I understand that they are.

Mr. MILLER. I understand they are. Since I became president—of course this all took place before I came in—the outgoing president told me this, and the conditions we were in, and that we were proceeding under the imperfect contract; but by a mutual understanding, which had no record or anything, the actual signing of the contract had been left in abeyance, thinking something might come up in the negotiation of bonds, thinking something might have to be changed and it could be changed better before it was actually signed than it could otherwise; but we were proceeding under the contract as there drawn up.

Senator EVARTS. That would come to this, that if the contract was executed what had been done between the two companies would be treated as if it were executed.

Senator FRYE. That is, if $1 was expended $2 would be expected.

Senator DOLPH. As I understand you, Mr. Hitchcock, the consideration to be paid by the Canal Company, which is, in fact, the conditions on your part, is still left open and undertermined; that is, the amount of stock and bonds to be paid under this contract is still undetermined?

Mr. MILLER. Not left open so far as our company is concerned at all, unless we see fit to re-open it.

Mr. HITCHCOCK. What I mean is this, that the Maritime Company must realize sufficient from its stock and bonds to build this canal, and until it can see a little clearer what it is going to get for its stock and bonds, we can not tell how much to put into this contract.

Q. Under that contract what would the Maritime Company have to do with the stock and bonds? If the construction work is to be so much stock and so much bonds, the contract being executed, that would be their lookout?—A. Yes, perfectly true. They have consulted our committee, and we have to be consulted as to the duration of the bonds, and they have asked us to consider the market with them.

Q. So that, to come back to my question, the amount, as you understand it, of stock and bonds, that is the consideration to be paid by your company, is still an open matter?—A. It is a matter which we may see fit to reopen.

Q. Do I understand you to say that the amount, as well as the interest and duration, is open?—A. In the way that I have stated. Until we can see more clearly than we can now about what is to be realized for stock and bonds we can not tell how much to pay.

Q. In other words, the Construction Company is not willing to take a specified amount of the stock and bonds of your company for the work, but that is to be left open until they ascertain what the stock and bonds are to be sold for, so that they can get sufficient consideration?—A. That question can be better answered by the Construction Company.

Q. I merely asked what you thought.

The CHAIRMAN. This is absolutely certain, that Congress will probably not intervene and subscribe for this stock until the amount of the stock and the cost of the improvements are fixed, and probably until modifications are made by the consent of these two contracting parties.

Mr. DOLPH. I can not see how.

Mr. MILLER. The considerations are all set out in that contract. We have gone on directly under that contract since I have been president.

By Senator EDMUNDS:

Q. When did you begin to be president?—A. I came in in February.

Q. That was a month after the meeting of the two boards of directors?—A. About that. There is nothing now that prevents my signing that document to-morrow and calling upon the Maritime Company to sign it.

Q. But I understand you to say now that that contract, to which we refer, is a positive obligation and you are executing it on the part of your company?—A. I am; yes, sir.

Q. Well, if it is a positive obligation why is not that obligation just

as difficult to deal with as if it was signed?—A. It is. As I said, it ought to have been signed. I found it in that condition and so I went on with it.

Q. Then, if we correctly understand you now, speaking as the president of the Construction Company, the contract of which we have been speaking is in force and is in process of execution?—A. Yes, sir.

Q. Just as it reads?—A. Just as it reads; that is my understanding.

Q. Then I think it right to say right here to Mr. Hitchcock and you, only speaking for myself alone, that the situation is totally different from what I understood it to be when we had the pleasure of hearing your statements two or three weeks ago, and if your contract is binding there is nothing, as a member of Congress, I wish to do on the subject. It is totally out of any disposition of mine to undertake to go into a scheme that is already committed for $150,000,000 bonds and $70,000,000 stock, but, as I say, I only speak for myself.

The CHAIRMAN. To that I will subscribe. So far as any aid is to be rendered by Congress is concerned, the difficulty with me is the $19,500,000 outstanding. As a matter of course, what Costa Rica and Nicaragua are to get is right under the concessions, but it seems to me, as to your $12,000,000, there will have to be a re-adjustment of that matter.

By Senator EDMUNDS (to Mr. Miller): Let me see if I understand in point of fact as to actual outgoes, leaving out of view for the moment the labor, time, and trouble, and the value of influence and all that, but in actual money. I understand, from Mr. Hitchcock's statement, and perhaps from yours also the other day, and now again from Mr. Hitchcock, that somewhat towards half a million dollars were spent by the gentlemen composing the original association in one way and another to get the concessions. Now, then, since the concessions have been turned over to the Colorado association, no cash was paid, but $12,000,000 in stock. Now, then, the Construction Company, being organized, has proceeded to issue stock of its own and raised money upon it. How much money has it raised?

Mr. MILLER. Well, it has issued no stock except the original——.

Q. Yes, how much money has the Construction Company raised?—A. It issued $4,000,000 stock at 50 cents on the dollar, and is now issuing the balance of it. It is not all issued yet and not all paid in, but it will have received for its stock about $3,500,000 turned back into the treasury, and that money is put into the construction of the canal expecting to be recompensed by the Maritime Company by the issue of its stock.

Q. Well that constitutes, then, the whole receipts for this stock of the company which it has issued at 50 cents?

Mr. DOLPH. And about $800,000 paid over from the Maritime Company besides?

Mr. MILLER. Yes, that has been paid for work that has been done.

By Senator EDMUNDS:

Q. That was paid for work, but under the permanent contract or how? You say the permanent contract is in force. That did not call for the payment of any cash?—A. That was paid before I had anything to do with it.

Q. Then the total amount of money your company has had up to now has been about $2,000,000?—A. Just at the present time. Of course there are obligations.

Q. Well, you subscribed for a million dollars stock of the Maritime Company; did you pay that in cash?—A. Yes.

Q. Where did you get the cash, on the issue of your own stock?—A. Yes.

Q. So that that is a part of the $2,000,000. So that the actual outgo all around down to this time, saying nothing about outstanding obligations, for execution of work is in round numbers $500,000 for obtaining concessions, etc., by the association and $2,000,000 besides?—A. That is about it. This other money is coming which——

Q. Yes, and other expenses of construction, I suppose, from day to day. Is that the substance of the statement?—A. Yes.

Q. How much stock of the Construction Company is now actually outstanding in round numbers; you do not know exactly?—A. Well, about $10,500,000, I should think, in round numbers.

Q. And on that there has been paid up 20 per cent., making $2,000,000——

Senator FRYE. No, but that includes the $6,000,000 in the Maritime Company.

By Senator EDMUNDS:

Q. About the whole of the capital stock of the Construction Company is outstanding; how much is the balance unpaid?—A. About $1,000,000, perhaps a little more.

By Senator DOLPH:

Q. That is a part of the $6,000,000 returned?—A. Yes.

By Senator EDMUNDS:

Q. Yes, but it comes out of the whole $12,000,000 of your capital stock, if I am right. Now, then, how much of this outstanding stock of your company which is in the hands of stockholders or anybody else is subject to assessment?—A. It is not subject to assessment at all except as it is sold. When it was sold, the stock sold at fifty cents on the dollar, was paid in installments.

Q. Yes, but a man having paid $50 would get a full paid share?—A. Yes.

Q. So that none of the stock is subject to further assessment?—A. No.

Mr. MILLER. In reference to Judge Edmunds's statement that he thought my statement varied from that of the other day, I have not gone over it carefully, but I do not think so. I stated in regard to the contract that the permanent contract had been completed as substantially made, that there were only some minor points left open. By left open I meant there was a general understanding between the two companies that if it became necessary to change it we could change it; that is, it was not one of those contracts that if Congress stepped in and wanted to do something we could not change the contract and make it satisfactory, or if a set of bankers came in and said we want this or that rate of interest, the change could not be made. That was my meaning at the time, but I stated distinctly that the main contract was substantially made as I understood it. So far as the Construction Company was concerned, if the Government wanted to come in and take stock or guaranty the bonds, I had not any doubt that satisfactory arrangements could be made that this contract could be changed by the consent of the two boards.

Senator EDMUNDS. The only remark I intended to make was that the situation as it now appears to me is entirely different from what I understood it.

Adjourned.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 332.

IN THE SENATE OF THE UNITED STATES.

APRIL 17, 1894.—Ordered to be printed.

Mr. CAREY, from the Committee on Public Lands, submitted the following

REPORT:

[To accompany S. 1591.]

The Committee on Public Lands, to whom was referred S. 1591, a bill to provide for the reservation, sale, and settlement of certain lands in several of the States and Territories, having considered the same, report the bill favorably and recommend its passage with amendments.

The letter of the Commissioner of the General Land Office to the Secretary of the Interior, hereto annexed, and made part of this report, sets forth very fully the objects and purposes of the bill.

A large number of bills have been introduced in this and previous Congresses having in view legislation which would secure or encourage the reclamation of portions of the arid lands. Many plans have been proposed but not one save the desert land law of 1878 has received the favorable consideration of Congress. All the bills introduced on the subject, appear to have been based on either of two propositions, viz, to donate the arid lands to the States in which they are situated, on condition that the States undertake their reclamation; or that the General Government, by appropriations of money from the Treasury, should undertake the construction of canals, dikes, dams, and other necessary works, to reclaim the arid lands wherever water is available, or can be made available by storage basins. Many think the General Government can distribute the lands far better among those who seek homes in a new country than would be possible under the different systems that would be adopted by the several States, but even these stand in awe of the proposition for the Government, commencing directly the reclamation of the arid lands. It can not be denied that the undertaking would be a most formidable one, and would cost many hundred millions of dollars.

The purpose of this bill under consideration is, so far as possible, to overcome these objections. The plan contemplated by the bill will prevent the lands falling into a few hands, and if the States avail themselves of its provisions it will cause as wide a distribution of the lands as could take place under the homestead law. The arid lands belong to the General Government. Without additional legislation by Congress on the subject the States are helpless. The land laws in existence are not well adapted to the arid region, but until some other mode is adopted and found practicable it will not be wise to repeal these laws.

The States where the arid lands are situated have done all it is

possible to do in the absence of Congressional legislation. They have passed good laws for the distribution of water. Some of these have provisions in their constitutions which provide that all water shall belong to the State, but that so long as water is available that no one shall be denied of its use for agricultural purposes. These States have officers to regulate the apportionment of water and to settle disputes between settlers growing out of its distribution.

All the various plans and usages of countries where irrigation is practiced have been considered and the best means to regulate the important subject have been adopted. These States have arrived at a time when Congressional action is absolutely necessary. The irrigation of arid lands under the most favorable circumstances is very costly. Before a settler can make a living upon these lands large expenditures of money must be made. The task is beyond individual effort. It will be difficult to estimate the amount of money (in the absence of reliable statistics) that has already been expended in irrigation work in the arid regions of the United States—probably not less than $200,000,000. These works may have cost double this amount; yet the beginning has scarcely been made. When all the visible water has been utilized then the investigation and experiments will have to be made to determine whether great storage basins are practicable for the conservation of the snow and rain precipitated during other than the growing seasons. Whether the raising of subterranean water supplies for purposes of irrigation is feasible is yet to be determined. There are many millions of acres where there is no available water supply for irrigation, but before these lands will have to be considered there are millions of acres, the irrigation of which is practicable and which would be undertaken if favorable legislation should be adopted.

The object of the bill is to permit the States, and the Territories when they shall become States, in which arid lands are situated to reserve a limited amount of such lands for reclamation, settlement, and disposal in small tracts to actual settlers.

This bill does not propose to grant any lands to the States, but only to reserve them for disposal to actual settlers after satisfactory proof has been furnished the Government that they have been reclaimed and settled upon. The title is not to pass out of the Government until the two chief conditions of the bill are fully complied with. First, that the lands shall be fully reclaimed; and second, that the lands shall be settled upon in tracts not exceeding 160 acres to each settler. There is no inducement in the bill for the States to take steps to cause any of the land to be reserved in advance of some well-formulated plan for their reclamation and settlement, for the States, under the provisions of the bill, can exercise no control over the lands reserved, except for the purpose of their reclamation and settlement.

If all the States to which the bill applies should avail themselves of the full acreage proposed to be reserved, it would only amount to a full percentage of the total acreage of the arid lands of the United States. The Government can not be injured by the experiment. If the States, or any of the States, should undertake the reclamation of any of the lands under the provisions of this bill and should fail to accomplish the purposes of the act, the lands would, by proclamation of the President, be released from such reservation and become subject to disposal as other lands of the United States.

If the States complied with the conditions of the act, the lands would be reclaimed, settled upon, and disposed of to actual settlers in small tracts, thereby accomplishing the same purpose as is contemplated by the homestead laws of the United States.

DEPARTMENT OF THE INTERIOR,
Washington, March 12, 1894.

SIR: I am in receipt, by your reference, of a copy of Senate bill No. 1591, "To provide for the reservation, sale, and settlement of certain lands in several of the States and Territories," said lands being of the class commonly known as "desert land." I have referred the same to the Commissioner of the General Land Office, a copy of whose report I submit herewith, and concur in his favorable recommendation.

Very respectfully,

HOKE SMITH,
Secretary.

Hon. JAMES H. BERRY,
Chairman Committee on Public Lands, U. S. Senate.

DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE,
Washington, D. C., March 2, 1894.

SIR: I have the honor to receive, by reference from the Department on February 15, 1894, for report in duplicate and return of papers, Senate bill No. 1591, "To provide for the reservation, sale, and settlement of certain lands in the several States and Territories," transmitted to the Department by the Hon. James H. Berry, chairman of the Senate Committee on Public Lands, with a request for the views of your Department thereon.

In reply thereto I have to report that the object of the bill is to encourage the reclamation, settlement, and disposal of lands in the arid belt of the United States, which will not produce, without artificial irrigation, agricultural crops.

The bill proposes that there may be selected and reserved, by each of the States to which the desert-land law is applicable, 1,000,000 acres of the arid lands therein, with the proviso that any of the said lands selected and reserved, which the State shall not reclaim or cause to be reclaimed within a period of three years, or shall fail to expend or cause to be expended in a like period in works for the reclamation of said lands at least $3 an acre, shall, on the proclamation of the President to that effect, again be subject to disposal under the land laws of the United States.

The bill further provides that when competent proof is furnished by any State that any of the lands reserved are reclaimed and occupied by actual settlers, in tracts not exceeding 160 acres to each settler, patents shall issue to the State or its assignees for such lands so reclaimed and settled in tracts not exceeding 160 acres to each person, with the proviso that the proceeds derived from the sale of the lands shall become a fund in the hands of the State for the reclamation of the arid lands so reserved and other lands in such State.

The bill is clear and is guarded in its terms. It is in the interest of small settlers. The United States holds the title until the lands reserved are actually reclaimed and settled. The States will have no power over the land, except for the purpose of reclamation and individual settlement, as expressed in the bill, while it will clothe the States with authority ample to induce the reclamation and settlement of the reserved lands, especially by colonies, a system which has worked admirably in several of the States to which the bill will apply.

The bill does not propose to interfere with the existing laws of the United States affecting the disposal of lands to individuals.

The building of irrigation works has been found to be very expensive, costing from $5 to $30 an acre for land irrigated under the most favorable circumstances, and only where it has been possible to secure large bodies of land has the cost been the minimum. Consequently, the most successful settlements, notably in California and Colorado, under irrigation canals, have been where the lands could be procured in bodies, generally within Spanish and railroad grants.

Now that the lands along the water courses, as a rule, have been taken, the question arises, how can the lands difficult and expensive to irrigate be made available for settlement?

The people of the States in which the arid lands are located would like to see the United States undertake their reclamation. This is certainly impracticable now, and it is doubtful whether it will ever be otherwise. There are those who think that the arid lands should be given to the States under certain restrictions. Public sentiment would scarcely justify such legislation at this time. The experience of the United States and the several States under the swamp-land acts does not argue in favor of such disposal of the arid lands. That additional legislation to induce

the reclamation and settlement of arid lands is necessary can not be denied, and since the entire acreage to be reserved under the bill, if all the States to which it is applicable should avail themselves of its provisions, would not be as great as each of the several States acquired under the swamp acts.

Congress may well try the experiment here proposed, retaining the title in the United States as the bill proposes, so that if the results are satisfactory, which I have no doubt will be the case, like comprehensive legislation may hereafter be enacted to cover other large bodies of land. The following table approximates the average of public lands vacant in the several States and Territories to which the bill, if it should become a law, would be applicable:

	Acres.
Arizona	49,000,000
California	47,000,000
Colorado	41,000,000
Idaho	37,000,000
Montana	74,000,000
New Mexico	54,000,000
North Dakota	18,000,000
Oregon	37,000,000
South Dakota	13,000,000
Utah	35,000,000
Washington	18,000,000
Wyoming	53,000,000
Total	529,000,000

Maximum amount to be reserved under this bill, 13,000,000 of the total amount of 529,000,000 acres.

The general desert-land law requires payment to the United States of $1.25 per acre, but does not require actual settlement and residence on the land. This bill proposes to both reclaim and settle the lands reserved thereunder. The State will thereby accomplish under this law what the Federal desert-land law and homestead laws separately provide. As the State is required to devote the entire proceeds of these lands to aid their reclamation the additional condition of settlement by individuals on each 160-acre tract is the full equivalent of the Federal policy of disposing of the public domain to actual settlers, and fully justifies legislation in the form proposed by the bill.

The reclamation of the arid lands can not be accomplished to any great extent through the efforts of any single individual. Home seekers are not men of means. The construction of canals and ditches to irrigate a single quarter section usually involves expenditure far beyond individual ability and far beyond the values which a reclaimed single quarter section would yield. Combined effort of many settlers to reclaim large bodies of land can not be secured nor successful results accomplished except under such municipal superintendency as shall insure economic and safe expenditure under intelligent control, and yielding thereby the greatest measure of success.

Enterprise thus undertaken under State control, under plans subjected to scrutiny of State officers, disbursements directed by intelligent comprehension of the plan proposed and utility of the end designed and the certainty through State superintendency that the settlers will be protected in the enterprise, furnish the strongest guarantee of success which experience can suggest. The States are highly interested in the reclamation of the arid lands within their boundaries and the settlement and cultivation thereof by individual citizens. The work is too vast to be undertaken by the General Government. Local and community interest under State control will stimulate results with far greater zeal and success. The principal proposition involved, reclamation and settlement by individuals in small holdings, meets my strong approval, and this bill seems to me to present full opportunity for the practical experiment and under proper safeguards. The United States retains title until reclamation is accomplished and the land occupied by actual settlers. This, if successful, is the great object to be attained; and if unsuccessful the United States still holds the unincumbered fee.

I suggest that the bill be amended by striking out the word "three" in line 9, in section 1, and insert in lieu thereof the word "six," as time will be required for the States to perfect legislation to carry the provisions of the proposed law into effect. After a careful examination of the bill and for the reasons stated, I recommend its passage with the amendment suggested.

Very respectfully,

S. W. LAMOREUX,
Commissioner.

The SECRETARY OF THE INTERIOR.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 333.

IN THE SENATE OF THE UNITED STATES.

APRIL 17, 1894.—Ordered to be printed.

MR. MARTIN, from the Committee on Public Lands, submitted the following

REPORT:

[To accompany bill H. R. 5065.]

The Committee on Public Lands, to whom was referred House bill No. 5065, "An act to ratify the reservation of certain lands made for the benefit of Oklahoma Territory, and for other purposes," have had the same under consideration and we recommend that the bill be amended as follows, to wit:

Strike out all after the last "and" in the twelfth line of the said act and insert as follows:

All of said lands and all of the school lands in said Territory may be leased under such laws and regulations as may be hereafter prescribed by the legislature of said Territory; but until such legislative action the governor, secretary of the Territory, and superintendent of public instruction shall constitute a board for the leasing of said lands under the rules and regulations heretofore prescribed by the Secretary of the Interior, for the respective purposes for which the said reservations were made, except that it shall not be necessary to submit said leases to the Secretary of the Interior for his approval; and all necessary expenses and costs incurred in the leasing, management, and protection of said lands and leases may be paid out of the proceeds derived from such leases.

And as amended your committee recommend its passage.

DEPARTMENT OF THE INTERIOR,
Washington, April 9, 1894.

SIR: I have the honor to inclose a copy of a letter from the Commissioner of the Land Office upon H. R. 5065.

The views presented by the Commissioner meet with my approval.

Respectfully,

HOKE SMITH,
Secretary.

Hon. JOHN MARTIN,
U. S. Senate.

DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE,
Washington, D. C., April 9, 1894.

SIR: I have had my attention called to a proposed amendment to H. R. 5065, entitled "An act to ratify the reservation of certain lands made for the benefit of Oklahoma Territory, and for other purposes," submitted by the Hon. John Martin, U. S. Senate, as follows, viz:

Strike out all after the last "and" in the twelfth line and insert as follows: "all of said lands and all of the school lands in said Territory may be leased under such laws and regulations as may be hereafter prescribed by the legislature of said Territory; but until such legislative action the governor, secretary of state, and superintendent of public instruction shall constitute a board for the leasing of said lands, under the rules and regulations heretofore prescribed by the Secretary of the Interior, for the respective purposes for which the said reservations were made, except that it shall not be necessary to submit said leases to the Secretary of the Interior for his approval, and all necessary expenses and costs incurred in the leasing, management, and protection of said lands and leases may be paid out of the proceeds derived from such leases."

I have the honor to state that the proposed amendment meets my approval.

The Commissioner of the Land Office, in his report for 1893, recommended that the requirement to submit leases of school lands to the Secretary of the Interior should be dispensed with. The experience of the Department has been that these leases must be approved almost exclusively upon the recommendation of the Territorial officers. This being true, it is simply a waste of time and additional work, without any benefit, to require them to submit these leases to the Department.

I inclose copy of said bill and proposed amendment.

Respectfully,

S. W. LAMOREUX,
Commissioner.

The SECRETARY OF THE INTERIOR.

[House Report No. 251, Fifty-third Congress, second session.]

The Committee on the Public Lands, to whom was referred the bill (H. R. 3610) to authorize the governor of Oklahoma Territory to lease certain lands, and for other purposes, have had the same under consideration, and report it back with the recommendation that it be laid upon the table and that the accompanying substitute therefor be passed.

The President in his proclamation opening the Cherokee Outlet reserved section 13 in each township, which had not been otherwise reserved or disposed of, for university, agricultural college, and normal school purposes, subject to the action of Congress; and also reserved section 33 in each township, which had not been otherwise reserved or disposed of, for public buildings. The proclamation as to these lands was as follows:

"Excepting also that section 13 in each township, which has not been otherwise reserved or disposed of, is hereby reserved for university, agricultural college, and normal school purposes, subject to the action of Congress; excepting also that section 33 in each township, which has not been otherwise reserved or disposed of, is hereby reserved for public buildings."

This bill will ratify the said reservations made by the President and authorize the leasing of the lands for a period of not exceeding three years for the purposes for which they were reserved.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 335.

IN THE SENATE OF THE UNITED STATES.

APRIL 18, 1894.—Ordered to be printed.

Mr. WASHBURN, from the Committee on Commerce, submitted the following

REPORT:

[To accompany H. R. 5978.]

The Committee on Commerce, to whom was referred the bill (H. R. 5978) to authorize the construction of a steel bridge over the St. Louis River between the States of Wisconsin and Minnesota, do report the same back with the following amendments, and recommend its passage:

On page 3, section 3, lines 1 and 2, strike out the words "lines ten and eleven of," so as to read—

SEC. 3. That the accessory works referred to in the preceding section shall be, etc.

On page 4, section 4, line 1, after the word "bridge," insert the word "built," so as to read—

SEC. 4. That the bridge built under this act shall be, etc.

[House Report No. 488, Fifty-third Congress, second session.]

The Committee on Interstate and Foreign Commerce, to whom was referred the bill (H. R. 4694) to authorize the construction of a steel bridge over the St. Louis River between the States of Wisconsin and Minnesota, report the same back with a substitute therefor and with the recommendation that the substitute do pass.

The substitute includes all the provisions which the War Department, in its report upon the original bill, suggested to be made in that bill. The other provisions of the substitute which do not appear in the original bill have no connection with the navigation of the St. Louis River except one, and that requires the bridge to be higher in the clear above high-water mark than it is required to be in the original bill.

The report upon H. R. 4694 by the War Department, which is contained in the accompanying letters, dated January 3, 1894, from the Secretary of War, December 29, 1893, from the Chief of Engineers of the U. S. Army, and December 20, 1893, from Maj. C. B. Sears and Col. O. M. Poe, of the Corps of Engineers of the U. S. Army, is made a part of this report. The report of the War Department shows that, in its opinion, if the amendment it proposes be adopted, and if but one bridge is built at the point indicated in the substitute, there is no objection to the passage of the latter, so far as the interests of navigation are concerned. It is proper to add, therefore, that this substitute provides for the only bridge at this point which your committee have recommended.

Your committee further recommend that H. R. 1952, H. R. 3209, and H. R. 4987, which are bills in the same connection, do lie upon the table.

WAR DEPARTMENT,
Washington, D. C., January 3, 1894.

SIR: I have the honor to acknowledge the receipt of your letter of December 15, 1893, referring to this Department a copy of H. R. 4694, Fifty-third Congress, second session, "to authorize the construction of a steel bridge over the St. Louis River between the States of Wisconsin and Minnesota," and in response to invite your attention to the inclosed letter from the Chief of Engineers, dated December 29, 1893, submitting a copy of the report of Maj. C. B. Sears, Corps of Engineers, local engineer in charge, dated December 20, 1893, whose views and conclusions are concurred in by Col. O. M. Poe, Corps of Engineers, division engineer of the northwest division.

The views of these officers are also concurred in by the Chief of Engineers, who submits a copy of the bill amended in accordance therewith, and remarks that in his opinion, unless so amended, the passage of the bill by Congress would be decidedly hurtful to the navigation interests. The Chief of Engineers further invites attention to the fact that his office has previously made reports on three other House bills during the present Congress, proposing to authorize the construction of bridges at this locality, and he emphasizes the opinion heretofore expressed that under no circumstances should more than one bridge be authorized.

Very respectfully,

DANIEL S. LAMONT,
Secretary of War.

The CHAIRMAN OF THE COMMITTEE ON
INTERSTATE AND FOREIGN COMMERCE,
House of Representatives.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 29, 1893.

SIR: I have the honor to acknowledge the reference to this office of letter of the 15th instant from the Committee on Interstate and Foreign Commerce of the House of Representatives, inclosing for the views of the War Department thereon H. R. 4694, Fifty-third Congress, second session, "A bill to authorize the construction of a steel bridge over the St. Louis River between the States of Wisconsin and Minnesota."

This bill was referred to Maj. C. B. Sears, Corps of Engineers, the district engineer, and that officer recommends its amendment as follows:

Section 1, line 11, after the word "cars," insert "on double tracks permitting the passage of trains in opposite directions at the same time."

Insert as a new section, to be numbered 3, as follows:

"SEC. 3. That the accessory works referred to in lines 10 and 11 of the preceding section shall be such booms, dikes, piers, or other suitable and proper structures for confining the flow of water to a permanent channel, and for the guiding of steamboats, rafts, and other water craft safely through the draw and rafting spans, as shall be required by the Secretary of War; and in addition thereto, and before the construction of the bridge to be built under this act, the company or persons owning or holding such bridge shall be required, under the direction of the Secretary of War, or such officer as he shall designate, to dredge out to a minimum depth of 21 feet, the two triangular spaces above and below the proposed site of the bridge included in the interior angles formed by the crossing of the two channels at 'The Gate,' to such an extent as to create a basin, the easterly and westerly limits of which shall be, respectively, at not to exceed 1,000 feet from the axis of the bridge, and such basin shall be maintained by the said company or persons owning and holding said bridge, at all times thereafter, in a condition affording safe navigation to all vessels drawing 20 feet of water."

Renumber the succeeding sections.

The reasons for the changes recommended are clearly set forth in a report dated the 20th instant from Maj. Sears, copy herewith, and his views and conclusions meet the approval of Col. O. M. Poe, Corps of Engineers, the division engineer.

Concurring in the views of these officers, I submit herewith a copy of the bill amended in accordance therewith, and I beg to say that, in my opinion, unless so amended, its passage by Congress would be decidedly hurtful to the navigation interests.

Attention is invited to the fact that this office has previously made reports on three other House bills during the present Congress, proposing to authorize the con-

struction of bridges at this locality, and I desire to emphasize the opinion heretofore expressed, that under no circumstances should more than one bridge be authorized.

The letter and its inclosures from the committee are herewith returned.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,
Brig. Gen. Chief of Engineers.

Hon. D. S. LAMONT,
Secretary of War.

UNITED STATES ENGINEER OFFICE,
Duluth, Minn., December 20, 1893.

GENERAL: In compliance with your letter of December 16, 1893, referring to me for report H. R. bill 4694, I have the honor to submit the following:

The matter of a bridge between Connors Point and Rices Point in this harbor has been several times reported upon by my predecessor and myself, and by Maj. Gregory, temporarily in charge of this office, so that it will be necessary for me simply to repeat, concisely, the substance of my previous reports.

The business interests of the cities of Duluth and Superior seems to require a bridge at the narrowest place between the two cities. This point is the one mentioned in the present bill. It intersects, at their crossing, the two navigable channels connecting Superior and St. Louis bays, and hence any bridge will be an obstruction as long as vessels using these channels would have to approach the bridge at an acute angle to its axis.

The Lake Carriers' Association, which represents the maritime interests on the Great Lakes, by resolution of August 15, 1893, has given its approval to a bridge between Rices Point and Connors Point which shall fulfill certain requirements. The present bill as amended will more than meet these requirements, and as thus amended I see no objection to its passage, or that of any bill fulfilling the same conditions.

The amendments I would recommend are as follows:

In line 11 of section 1, after the words "steam cars," to insert the following: "On double tracks permitting the passage of trains in opposite directions at the same time." No bridge should be permitted at this point which will require alterations or enlargement in many years to come. The growing commerce of the two cities of Duluth and Superior is such that a single-track railway bridge would soon become inadequate to fulfill the demands that would be made upon it, and a bridge that is constructed under this act should be as large and substantial and complete in every way as is compatible with a reasonable cost, and its capacity when first built should be equal to all the demands that would be made upon it and leave no excuse for the construction of another bridge in this vicinity.

Section 3, as interlined, defines the nature of the accessory works mentioned in section 2, and, furthermore, provides for certain dredging, which I consider the most important feature connected with this bridge. The franchise granted by the bill is a very valuable one, and any company obtaining it will well be able to do the dredging called for by the creation of the basins mentioned in the latter half of this section (3). These basins will permit vessels approaching along any of the channels leading to the bridge to straighten up and pass through the draw spans at right angles to the axis of the bridge.

Unless the dredging of these basins be made compulsory on the part of the company building the bridge I would recommend the disapproval of the entire bill.

That the parties asking for this franchise expect to do more or less dredging is shown by the wording in lines 12 and 13 of section 6 as amended. * * *

Very respectfully, your obedient servant,

CLINTON B. SEARS,
Major, Corps of Engineers, U. S. A.

Brig. Gen. THOS. L. CASEY,
Chief of Engineers, U. S. Army, Washington, D. C.

(Through Col. O. M. Poe, Corps of Engineers, Division Engineer Northwest Division.)

(First indorsement.)

U. S. ENGINEER OFFICE,
Detroit, Mich., December 22, 1893.

Respectfully forwarded to the office of the Chief of Engineers.

The report and recommendations made by Maj. Sears appear to fully cover the case. I concur with him in his views and conclusions.

O. M. POE,
Colonel, Corps of Engineers, etc., Division Engineer Northwest Division.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 336.

IN THE SENATE OF THE UNITED STATES.

APRIL 18, 1894.—Ordered to be printed.

Mr. WASHBURN, from the Committee on Commerce, submitted the following

REPORT:

[To accompany H. R. 4765.]

The Committee on Commerce, to whom was referred the bill (H. R. 4765) to authorize the St. Louis River Bridge Company and the Duluth Transfer Railway Company to construct, maintain, and operate a bridge over the St. Louis River from a point at or near Grassy Point, in the village of West Duluth, Minn., to the most available point opposite, in the State of Wisconsin, do report the same back without amendment and recommend its passage.

[House Report No. 487, Fifty-third Congress, second session.]

The Committee on Interstate and Foreign Commerce, to whom was referred the bill (H. R. 4765) to authorize the St. Louis River Bridge Company to construct, maintain, and operate a bridge over the St. Louis River from a point at or near Grassy Point, in the village of West Duluth, Minn., to the most available point opposite, in the State of Wisconsin, report the same back with an amendment and with the recommendation that the bill as so amended do pass.

Amend by striking out all after the word "however," in line 30 of section 1, to the end of section 1, and inserting in lieu thereof as follows: "that said bridge and its approaches shall be made free of tolls to wagons, teams, foot passengers, and street railways at the end of twenty years from the passage of this act, if not made free before the end of said time."

The accompanying letters from the War Department, under date of October 3, 1893, from the Chief of Engineers of the U. S. Army, and of October 4, 1893, from the Secretary of War, which constitute a report from the War Department in regard to H. R. 1976, are made a part of this report. They show that, in the opinion of the War Department, there is no objection to the passage of this bill so far as the interests of navigation are concerned, because so far as those interests are involved H. R. 4765 is a redraft of H. R. 1976 with the amendments proposed by the War Department letters.

The War Department recommends that only one bridge should be built at the point indicated in the bill. Your committee, therefore, further recommend that all the bills other than H. R. 4765, heretofore referred to it, which relate to a bridge at this point, do lie upon the table, and the bills recommended to lie on the table are H. R. 1976 and H. R. 3235.

WAR DEPARTMENT,
Washington, D. C., October 4, 1893.

SIR: I have the honor to return, herewith, House bill 1976, Fifty-third Congress, first session, "to authorize the St. Louis River Bridge Company, and its successors in interest, to construct, maintain, and operate a bridge over the St. Louis River from a point at or near Grassy Point, in the State of Minnesota, to the most available point opposite, in the State of Wisconsin," which was referred to this Department on the 16th ultimo, and beg to invite your attention to the inclosed report of the Chief of Engineers, dated the 3d instant, and to the amended copy of the bill submitted by that officer, who remarks that a bill (H. R. 3235) is now pending in the present Congress to authorize an additional railroad bridge over the St. Louis River at Grassy Point, but in his judgment only one additional bridge should be authorized at that locality.

Very respectfully,

DANIEL S. LAMONT,
Secretary of War.

The CHAIRMAN OF THE COMMITTEE ON
INTERSTATE AND FOREIGN COMMERCE,
House of Representatives.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., October 3, 1893.

SIR: I have the honor to acknowledge reference to this office for report of letter of the 16th ultimo from the Committee on Interstate and Foreign Commerce of the House of Representatives, inclosing, with request for War Department views thereon, H. R. 1976, Fifty-third Congress, first session, "A bill to authorize the St. Louis River Bridge Company and its successors in interest to construct, maintain, and operate a bridge over the St. Louis River from a point at or near Grassy Point, in the State of Minnesota, to the most available point opposite, in the State of Wisconsin."

In returning these papers I have the honor to recommend that the bill be amended as follows:

Section 1, line 7, after the word "river," insert "at a point to be approved by the Secretary of War."

Section 2, line 5, change "fifty" to "seventy-five," and in line 6, after the word "draw" insert "and also a fixed span with a length of not less than one hundred and seventy-five feet to permit the passage of rafts under said bridge," and at the end of the section add the following proviso: "And provided further, That said company or corporation shall maintain, at its own expense from sunset to sunrise, such lights or other signals on said bridge as the Light-House Board shall prescribe."

Section 7, line 15, strike out the words "and directed."

Section 9, lines 4 and 5, strike out all after the word "date" in line 4, and substitute therefor the word "hereof."

A copy of the bill with the amendments recommended above is inclosed.

A bill (H. R. 3235) is pending in the present Congress to authorize an additional railroad bridge over the St. Louis River at Grassy Point, but in my judgment only one additional bridge should be authorized at this locality.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

Hon. D. S. LAMONT,
Secretary of War.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 337.

IN THE SENATE OF THE UNITED STATES.

APRIL 18, 1894.—Ordered to be printed.

Mr. PALMER, from the Committee on Pensions, submitted the following

REPORT:

[To accompany S. 1480.]

The Committee on Pensions have carefully examined the bill (S. 1480) to codify and arrange the laws relating to pensions, and beg leave to report the same favorably, and submit herewith the correspondence pertaining to the same as a part of this report, with the recommendation that the bill do pass.

OFFICE OF THE ASSISTANT SECRETARY OF THE INTERIOR,
Washington, D. C., March 9, 1894.

SIR: I return herewith the bill (H. R. 3231) to codify and arrange the laws relating to pensions, which you submitted to this Department on October 11, 1893, with the request that it be considered and an opinion given as to the desirability of its enactment into law. I am much impressed with the importance of this matter, and in addition to seeking the opinion of the Commissioner of Pensions, a copy of whose opinion I inclose herewith, I have given careful personal attention to the arrangement of the details of the bill, and am convinced that in all respects it is worthy of commendation.

The Secretary of the Interior in his recent annual report recommended the codification of the pension laws, and it is believed that this bill now before your committee, if speedily enacted, will supply the obvious need which prompted that recommendation.

As to the detail of the work I have but one single suggestion to make, namely, that in lines 6 and 7 of section 160 the words "from and after August 7, 1882," be omitted, as involving, possibly, a change in the term or intent of that act, which purpose is disclaimed in the closing section of the bill.

I heartily concur in the statements of the Commissioner of Pensions, herewith.

Very respectfully,

JOHN M. REYNOLDS,
Assistant Secretary.

Hon. W. T. ELLIS,
House of Representatives.

BUREAU OF PENSIONS,
Washington, D. C., February 26, 1894.

SIR: On October 13, 1893, you referred to me for consideration and report the bill H. R. 3231, "to codify and arrange the laws relating to pensions," together with a letter from Hon. W. T. Ellis, chairman of the Committee on Revision of the Laws of the House of Representatives, addressed to yourself and requesting that you advise him whether in your opinion the bill ought to pass and whether it ought to be amended in any respect.

I have examined personally and with great care the bill presented to me (which I am informed is identical with the Senate bill No. 1480), giving particular attention to those sections wherein the condensation of existing statutes is most apparent, and which, therefore, present the greater opportunity for inaccuracy or error or omission.

In my opinion this bill of 22 chapters, comprising 190 sections, each with an appropriate and suggestive title, presents, in homogeneous form and logical order, all the legislation now in force relating to the pension system. I do not recommend any amendment to the bill, as, in my judgment, no amendment could be made which would not involve a departure in some degree from the existing law and practice, which would be aside from the purpose of the bill as indicated by its title.

To my mind the utility of the speedy enactment of this bill, reducing to one systematic entity the complex, detached, and fragmentary pension legistation of a hundred years, and forming a guide and basis for any future enactments looking toward simplification and equalization of these laws, is beyond question.

Very respectfully,

WILLIAM LOCHREN,
Commissioner.

The SECRETARY OF THE INTERIOR.

WASHINGTON, D. C. *February 5, 1894.*

MY DEAR SENATOR: I have made a careful examination of Senate bill 1480, being the bill to codify and arrange the laws relating to pensions, which you kindly sent to me for my examination with the request that I express an opinion concerning the same after doing so.

The bill does not change the existing law, so far as I am able to learn. It appears to be a convenient codification and arrangement of the existing pension laws, whereby any particular section or provision may be more readily referred to, and it is something very greatly to be desired for the benefit of all concerned. As the laws stand to-day they are scattered throughout all the publications giving the laws, and the amendments are scattered, and it is very difficult to decide just what is the law, and which sections have been modified by amendments. I have examined it more particularly to see, first, if there was any omission of important provisions, and, second, whether or not there were any words added which would in anywise change the force of existing laws, and I am confident that neither has been done.

Paragraph 142 of the bill, section 191, would cure any omission or addition should any have been made.

I would suggest that when this bill is put upon its passage it should be carefully watched to see that no amendments are made upon the floor which might change existing laws; but even in that case section 191 would have to be cut out in order to give an amendment any force. On the whole I am clear in the opinion that it would be a most excellent thing to pass the bill as it stands.

Very truly, yours,

W. W. DUDLEY.

Hon. JACOB H. GALLINGER,
U. S. Senate, city.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 338.

IN THE SENATE OF THE UNITED STATES.

APRIL 18, 1894.—Ordered to be printed.

Mr. PEFFER, from the Committee on Claims, submitted the following

REPORT:

[To accompany S. 487.]

The Committee on Claims, to whom was referred the bill (S. 487) for the relief of the widow and heirs of Samuel Kramer, have had the same under consideration and report the bill back with the recommendation that it be passed with the following amendment:

Add at end of last line the following:

The payment not to exceed eighteen hundred dollars, which shall be in full for all services rendered as chaplain by the said Samuel Kramer.

The history of the case and the facts bearing on it are fully set out in Report No. 1163, House of Representatives, Fifty-second Congress, first session, which report we adopt as our own and make it part hereof.

[House Report No. 1163, Fifty-second Congress, first session.]

The Committee on Claims, having under consideration the bill (H. R. 5428) for the relief of Matilda S. Kramer, widow, and Mary W. Kramer, daughter, of the late Samuel Kramer, acting chaplain at the navy-yard, Washington, D. C., beg leave to submit the following report thereon:

It appears from the evidence presented to your committee that Chaplain Samuel Kramer was designated by the Secretary of the Navy to act as chaplain at the navy-yard in this city on the 3d day of July, 1880, on the death of the regular chaplain at that post; he continued so to act until May 15, 1882, receiving compensation by order of the Secretary of the Navy at the rate of $75 per month from the contingent fund. At this late date (May 15, 1882) it was found that the fund was exhausted and the commandant was so notified; and that Chaplain Kramer was acting with such efficiency and usefulness that he was continued without pay until the 20th of June, 1883, when the commandant of the yard again called the attention of the Navy Department to the matter in the following letter:

U. S. NAVY-YARD, WASHINGTON,
Commandant's Office, June 20, 1883.

SIR: I would respectfully mention the case of the Rev. Samuel Kramer, who has been acting as chaplain of the navy-yard since the 30th of June, 1882, without pay.

Mr. Kramer continues to hold divine service every Sunday and performs all the duties of a chaplain, visits the hospital, and attends funerals. He is faithful in the discharge of all these duties.

I would respectfully ask that, if compatible with the public service, some provision be made for him by the 1st of July.

Very respectfully, your obedient servant,

T. PATTISON,
Commodore, Commandant.

Hon. WM. E. CHANDLER,
Secretary of the Navy.

Thus Mr. Kramer was continued in the service until finally relieved by Chaplain Clark, a regular chaplain of the Navy, on May 15, 1884.

On July 5, 1884, Congress passed an act appointing and retiring Chaplain Kramer, but President Arthur (in view of the case of Gen. Fitz John Porter) declined to sign the bill, and, only nine days remaining of the session, it failed to become a law.

At that date Mr. G. D. Wise (then and now a member of this House), being instructed by the Committee on Naval Affairs, made the following report, which we desire should form a part of this report, as it gives the record from the Navy Department in this case:

[House Report No. 692, Forty-eighth Congress, first session.]

The Committee on Naval Affairs, to whom was referred the joint resolution (H. Res. 17) authorizing the appointment and retirement of Samuel Kramer, a chaplain in the Navy of the United States, beg leave to report that they have examined the same and recommend its passage.

The following extract from a letter of the Secretary of the Navy, dated the 18th instant, together with the accompanying memoranda, fully explains the case:

NAVY DEPARTMENT,
Washington, July 18, 1882.

SIR: * * * * * * *

I inclose a large number of testimonials in Mr. Kramer's behalf, from which, and a memorandum summarizing the same, it appears that he has been most faithfully serving at the Washington navy-yard for several years, and that he has a record of much merit.

Very respectfully,

WM. E. CHANDLER,
Secretary of the Navy.

HON. JOHN F. MILLER,
Member of the Committee on Naval Affairs, United States Senate.

Memoranda in the case of Rev. Samuel Kramer, an applicant for appointment and retirement as a chaplain in the U. S. Navy.

The Rev. Samuel Kramer (an ordained minister of the Methodist Episcopal Church) performed the duties of chaplain at the navy-yard, Washington, *without pay*, for many years. On the 3d of July, 1880 (after the death of the chaplain in the Navy on duty in the yard), the Secretary of the Navy (Hon. R. W. Thompson) informed the commandant of the yard that Mr. Kramer should receive compensation for his services at the rate of $75 per month. He continued on duty, and to be so paid (out of the appropriation, "contingent Navy") until May 15, 1882, when, on account of want of funds, he was, with others, notified that his services would not be required after June 30, 1882. During this time there was no regular chaplain on duty at the yard.

Mr. Kramer is strongly recommended by the commandant of the yard (Commodore Pattison), who states, May 23, 1882, that "he has been a faithful chaplain, and is highly spoken of by everybody who knows him. As he has served as a seaman in the Navy, he is invaluable as a chaplain. Seamen will listen to him when they will not to the general run of preachers. He is located in the seamen's library in this yard, attends the sick in the hospital, and officiates at funerals of deceased seamen and marines, and distributes Bibles and tracts." This letter is accompanied with a testimonial letter signed by all the officers of the yard.

February 1, 1881, Commodore A. A. Semmes, Commander R. D. Evans (then in command of the training-ship *Saratoga*), Commander J. D. Graham, commanding the receiving ship at the yard, and Lieut. D. G. McRitchie (then in command of the *Talapoosa*), joined with Commodore Pattison in asking the appointment of Mr. Kramer as a chaplain in the Navy, and that he be assigned to duty at the Washington navy-yard. These officers state that Mr. Kramer "has in our opinion obtained the love and respect of officers and men who have listened to his exhortations. For many years he has performed the duties of chaplain at this yard without pay, to the entire satisfaction of the officers and men on board the vessels of the United States Navy on which he has held divine service, and we are of the opinion that there is more good derived from the preaching of a converted sailor to sailors than from anyone who has never been to sea." (Mr. Kramer was too old for appointment, the law fixing the age between 21 and 35 years, and Mr. Kramer was over 60 years old.)

From letters and statements on file in the Navy Department it appears that Mr. Kramer followed the sea for many years; was in the United States Navy, serving on

the *Dolphin* and *Brandywine* in 1829. After leaving the service he entered the church, and has given more than twenty years' service, without pay, to the cause of seamen, building the Sailors' Bethel church in Baltimore, Md. He served as chaplain of the Third Regiment of Maryland (Union) Volunteers. At the battle of Antietam he acted as major of the regiment (in place of the major, who had been killed in a previous battle), and after that battle was, at the request of the colonel, commissioned as major. He was honorably discharged in August, 1863, on account of disability incurred in the line of duty. He is indorsed and recommended by Bishop E. G. Andrews, Rev. H. R. Naylor, Rev. John Lanahan, Rev. B. Peyton Brown, and Rev. W. W. Hicks, all of the Methodist Episcopal Church; Rev. W. A. Leonard, of St. John's (Episcopal) Church, Washington; Thomas L. Tullock, and Matthew G. Emery (ex-mayor), of Washington, and Chaplain M. J. Gonzales, U. S. Army.

Chaplain Kramer having recently deceased at an advanced age, his widow and daughter appear here and claim only the difference of the pay of a regular chaplain of the Navy for the four years he acted under orders as such, and the sum actually paid him for a portion of that time. The great usefulness and unexampled service shown by the records to have been rendered by Chaplain Kramer, as well as the pressing wants of his family to remove the indebtedness on their homestead, incurred by this service, would seem to demand a prompt and speedy recognition of the service as an act of simple justice.

The committee therefore recommend the passage of the bill.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 339.

IN THE SENATE OF THE UNITED STATES.

APRIL 18, 1894.—Ordered to be printed.

Mr. PROCTOR, from the Committee on Naval Affairs, submitted the following

REPORT:

[To accompany S. R. 74.]

The Committee on Naval Affairs, to whom was referred the joint resolution (S. R. 74) for the proper enrollment of Thomas R. Proctor, late of the Navy of the United States, having carefully considered the same, beg leave to report as follows: They adopt the following report of the House of Representatives, viz:

During the late war, 1861–'65, every rear-admiral, by commission or assignment, in the Navy of the United States who was commander of a squadron on actual sea service was by law entitled to a secretary, whose compensation was fixed by law.

Pursuant to the orders and regulations for the government of the Navy, the secretary to such squadron commander, when duly appointed, was, upon formal acceptance of his appointment after taking the statutory oath, subject to the laws and regulations for the government of the Navy until regularly discharged.

By the orders of the Secretary of the Navy, and by paragraph 5 of Article II of the Navy Regulations, it was prescribed that the secretary should be regarded as a staff officer, and, by paragraph 21 of the same article, that the relative rank of such staff officer should be with lieutenants of the Navy, and, by paragraph 680, he was declared to be a wardroom officer with all the privileges attaching to his staff rank.

These orders, regulations, and instructions were formally recognized by section 5 of the act of Congress approved July 14, 1862, for the government of the Navy.

The intent of these orders, promulgated in regulations thus recognized by Congress, was to give such secretary to a squadron commander the relative rank of lieutenant, and he was so considered and treated by the Navy Department and in the service, and wore the uniform appropriate to that grade, although his name was not entered on the Navy Register with other staff officers, probably because of the tenure of his naval service, which only continued for the period of actual service of the squadron to which he was attached, or of the commander of the squadron.

No different grade, rank, or position in the Navy has ever been prescribed for such staff officer, and, after the war, so much of the law as provided for the appointment of a secretary to the commander of a squadron was repealed and the duties of that office devolved upon lieutenants of the Navy who should be specially detailed for the purpose.

Thomas R. Proctor was duly appointed on October 1, 1864, secretary to Acting Rear-Admiral George F. Pearson, commander of the Pacific Squadron, and actually performed sea service with that squadron; and received the thanks of the Secretary of the Navy December 30, 1864, for meritorious conduct, and continued in active service until honorably discharged, December 12, 1866.

The object of this joint resolution is to give effect to the intent of the orders of the Secretary of the Navy and naval regulations recognized by Congress, which were in force during the service of Thomas R. Proctor as secretary to the Pacific Squadron in the late war, by his proper enrollment in the Navy Register with the relative rank he served under, and the committee recommend the passage of the resolution as a matter of simple justice.

This resolution confers no claim whatever to pay, allowances, pension, bounty, or other remuneration.

A letter from the honorable the Secretary of the Navy is hereto attached.

NAVY DEPARTMENT,
Washington, April 12, 1894.

SIR: The Department is in receipt of the communication of the 7th instant, inclosing House Resolution 155, "For the proper enrollment of Thomas R. Proctor in the Navy," in which you request an opinion as to the merits of the legislation proposed by said resolution.

In reply I have to inform you that the records of the Navy Department show that Thomas R. Proctor was duly appointed on October 1, 1864, secretary to Acting Rear-Admiral George F. Pearson, U. S. Navy, commander of the Pacific Squadron, under the law authorizing such appointment, at a fixed compensation, with one ration, and that he was honorably discharged from the Navy on December 1, 1866, and meanwhile, while on actual sea service with that squadron, volunteered for a special service of danger and acted as aide to Commander Davenport in the expedition, for which he was mentioned by name in the official report and for which the thanks of the Navy Department were given on December 30, 1864. (*See* published report Secretary of the Navy, 1865.)

Under the orders, regulations, and instructions for the government of the Navy during the entire period of Mr. Proctor's service as secretary to the commander of the Pacific Squadron, which orders, regulations, and instructions were codified and promulgated in book form on April 18, 1865, it was prescribed that (paragraph 5) such secretary should "be regarded as a *staff officer*," and (paragraph 21) "should have *relative* rank with lieutenants," and (paragraph 680) "should be regarded as a *ward-room officer*, and as entitled to mess therein, to occupy it in common with his messmates, and to have the stateroom connected therewith prescribed for his own accommodation, if any such there be."

He was also (paragraph 1141) specifically included among "officers of the Navy," entitled to traveling expenses when traveling under orders, and by (paragraph 249) was declared to be subject to the laws and regulations for the government of the Navy, and required to subscribe to the same when formally accepting his appointment and taking the oath of allegiance, and was held subject thereto until regularly discharged, or until the return of the commander of the squadron to the United States.

On shipboard, in addition to his duties as secretary to the commander of the squadron, he was (paragraph 1140) given charge of the books allowed a flag vessel, and he was required to wear the uniform prescribed for a staff lieutenant.

These orders, regulations, and instructions of the Navy Department were formally *recognized* by Congress in the act (section 5) approved July 14, 1862.

No other grade, relative rank, or position was ever given to the office of secretary to the commander of a squadron.

Subsequently the law for the appointment of a secretary from civil life was repealed and the duties devolved by law upon lieutenants in the Navy detailed for the purpose.

During Mr. Proctor's service, before mentioned, he was, under the foregoing regulations, recognized and regarded by the Navy Department as a staff officer serving with the relative rank of lieutenant. His name was not, however, so enrolled with other staff officers on the Register of the Navy. This ommission was probably due to the fact that the tenure of his service as secretary to the commander of a squadron in the Navy of the United States only continued for the period of service of that squadron, or of the commander of the squadron.

As House resolution 155 only has for its object to remedy this omission by recording Mr. Proctor's name for the time he actually served in the Pacific squadron as secretary with the *relative* rank by which he was recognized under orders and regulations sanctioned by Congress, and as the resolution neither carries with it nor can confer any claim whatever to pay, allowances, pension, bounty, or other remuneration, and as Mr. Proctor's record in the naval service is both honorable and creditable, the Department, in view of the probability that this case will not establish a precedent, as it would seem to be a matter resting entirely within the discretion of Congress, sees no objection to the passage of the resolution.

Very respectfully,

H. A. HERBERT,
Secretary of the Navy.

Hon. JACOB A. GEISSENHAINER,
Chairman Subcommittee on Organization, Rank, and Pay,
Committee on Naval Affairs, House of Representatives.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 340.

IN THE SENATE OF THE UNITED STATES.

APRIL 18, 1894.—Ordered to be printed.

Mr. MANDERSON, from the Committee on Military Affairs, submitted the following

REPORT:

[To accompany S. 1644.]

The Committee on Military Affairs, to whom was referred the bill (S. 1644) entitled "A bill relating to the detail of retired officers of the Army at institutions of learning," having had the same under consideration report it back favorably and recommend its passage.

Under laws existing prior to the passage of the act of November 3, 1893, "to increase the number of officers of the Army to be detailed to colleges," officers of the Army on the retired list were detailed for duty at institutions of learning without expense to the Government other than that entailed by the issue of ordnance and ordnance stores, as provided in the act approved September 26, 1888.

The law which the bill before your committee proposes to construe is as follows:

AN ACT to increase the number of officers of the Army to be detailed to colleges.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section twelve hundred and twenty-five of the Revised Statutes, concerning details of officers of the Army and Navy to educational institutions, be, and the same is hereby, amended so as to permit the President to detail under the provisions of said act not to exceed one hundred officers of the Army of the United States; and no officer shall be thus detailed who has not had five years' service in the Army and no detail to such duty shall extend for more than four years, and officers on the retired list of the Army may, upon their own application, be detailed to such duty, and when so detailed shall receive the full pay of their rank; and the maximum number of officers of the Army and Navy to be detailed at any one time under the provisions of the act approved January thirteenth, eighteen hundred and ninety-one, amending section twelve hundred and twenty-five of the Revised Statutes as amended by an act approved September twenty-sixth, eighteen hundred and eighty-eight, is hereby increased to one hundred and ten.

Approved, November 3, 1893.

Under the construction placed upon the act of November 3, 1893, by the Department of Justice the whole number of officers of the Army, active and retired, permitted to be detailed to colleges is 100; and it is held that this number shall include all retired officers who were on duty at institutions of learning at the date of the approval of said act, which retired officers are held to be entitled to receive the full pay of their rank. It was clearly without the intent of the act of November 3, 1893, to include within the limit of 100 retired officers who were on

duty at the expense of the colleges to which they were detailed, and without cost to the Government, as is shown by the report on said law of the Committee on Military Affairs of the House of Representatives, which says, "as the enactment of this bill would not incur any additional expense." As the law is construed the expense to the Government would be increased to the extent of the difference between the retired pay of such officers and the full pay and allowances of officers on the active list. This fact has caused the War Department to rescind all such details of retired officers, and their recall will (under the construction put upon the act) necessitate the withdrawal of ordnance and ordnance stores issued to colleges to which this class of officers has been attached. Such colleges will then be compelled to buy their military equipment, as well as pay the salary of the military instructor. This hardship was certainly not intended in the passage of the law of November 3, 1893.

Your committee is of the opinion that the purpose of the act of November 3, 1893, was to provide for the detail of 25 additional officers of the Army (either active or retired) to educational institutions, and was not intended to affect in any way the status of retired officers detailed to colleges without expense to the Government.

In this view your committee recommend the immediate passage of the bill, the object of which is to restore the authority of the Executive to make details from the retired list without reference to the limit fixed by the act of November 3, 1893, and without expense to the Government other than that involved in the issue of ordnance and ordnance stores, which is left to the discretion of the Secretary of War.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 341.

IN THE SENATE OF THE UNITED STATES.

APRIL 18, 1894.—Ordered to be printed.

Mr. DANIEL, from the Committee on Claims, submitted the following

REPORT:

[To accompany S. 1824.]

The Committee on Claims, to whom was referred the bill (S. 1824) entitled "A bill to carry out the findings of the Court of Claims and for the relief of Samuel Fitzhugh, administrator of Henry Fitzhugh," respectfully report the same with the recommendation that it do pass.

This is a case in which the Court of Claims has found, upon a preliminary inquiry, that Henry Fitzhugh, in whose right the claim is made, was loyal to the Government of the United States throughout the war. The claim of his administrators is for supplies alleged to have been taken by or furnished to the military forces during the war, and was transmitted to the court by the Committee on War Claims of the House of Representatives on the 4th of August, 1886.

The Court of Claims finds as matter of fact that at the time and place alleged in the petition the military forces of the United States, for the use of the Army, took from the decedent, Henry Fitzhugh, stores and supplies amounting in value at the time of taking to the sum of $19,975. They made no allowance for tobacco taken, as it did not appear that it was used by the United States, and no allowance for rent or damages is claimed in said petition, those items not being regarded as within the jurisdiction of the court.

The whole claim was for $75,965.50. There seems to be no reason why the amount of $19,975 should not be paid to the administrators of Fitzhugh, as the stores were taken for the use of the Army and the proof thereof has been satisfactory.

Your committee append to this report copy of findings of the Court of Claims.

[House Mis. Doc. No. 63, Fifty-third Congress, second session.]

COURT OF CLAIMS, CLERK'S OFFICE,
Washington, January 16, 1894.

SIR: Pursuant to the order of the court, I transmit herewith a certified copy of the findings filed by the court in the aforesaid cause, which case was referred to this court by the Committee on War Claims, House of Representatives, under the act of March 3, 1883.

I am, very respectfully, yours, etc.,

JOHN RANDOLPH,
Assistant Clerk Court of Claims.

Hon. CHAS. F. CRISP,
Speaker of the House of Representatives.

[Court of Claims. Congressional, No. 1201. Samuel Fitzhugh, administrator of Henry Fitzhugh, deceased, *v.* The United States.]

This case, being a claim for supplies or stores alleged to have been taken by or furnished to the military forces of the United States for their use during the late war for the suppression of the rebellion, the court, on a preliminary inquiry, finds that Henry Fitzhugh, the person alleged to have furnished such supplies or stores, or from whom the same are alleged to have been taken, was loyal to the Government of the United States throughout said war.

BY THE COURT.

Filed November 21, 1892.

[Court of Claims. Congressional case No. 1201. Samuel Fitzhugh, administrator of Henry Fitzhugh deceased, *v.* The United States.]

STATEMENT OF CASE.

The claim in the above-entitled case, for supplies or stores alleged to have been taken by or furnished to the military forces of the United States for their use during the late war for the suppression of the rebellion, was transmitted to the court by the Committee on War Claims of the House of Representatives on the 4th day of August, 1886.

On a preliminary inquiry the court, on the 21st day of November, 1892, found that the person alleged to have furnished the supplies or stores, or from whom they were alleged to have been taken, was loyal to the Government of the United States throughout said war.

The case was brought to a hearing on its merits on the 26th day of October, 1893, Gilbert Moyers, esq., appeared for claimant, and the Attorney-General, by William J. Rannells, esq., his assistant, and under his direction, appeared for the defense and protection of the interests of the United States.

The claimant in his petition makes the following allegations:

That Henry Fitzhugh was all of his lifetime a loyal citizen of the United States, and that while the late war of the rebellion was in progress he resided in the county of Spottsylvania, in the State Virginia, and that during said period, while the war of the rebellion was still in progress, the U. S. forces, by proper authority, took from said Henry Fitzhugh quartermaster stores and commissary supplies of the value of $75,965.50 and appropriated the same to the use of the U. S. Army.

Said stores and supplies consisted of the following articles:

1,500 barrels of corn	$7,500.00
6,000 bushels of wheat	9,000.00
15 hogsheads of tobacco, 15,000 pounds	3,750.00
200,000 pounds of fodder	2,000.00
Grazing of horses and beef cattle	500.00
14 mules	2,100.00
100 sheep	400.00
25,000 pounds bacon	3,750.00
590 bushels Irish potatoes	737.50
4 wagons and gear	400.00
10,000 cords of oak wood	10,000.00
3 months' rent of mansion and damage	5,000.00
Total occupation of estate from April 1, 1862, to June 1, 1863	4,500.00
300 acres of wheat	10,350.00
75 hogs	375.00
75 cattle	1,500.00
20 horses, mules, and colts	2,000.00
500 barrels of corn	2,500.00
200 cattle	4,000.00
200 sheep	800.00
100 hogs	500.00
3 wagons and gear	300.00
Total	75,965.50

The court, upon the evidence and after considering the briefs and arguments of counsel on both sides, makes the following

FINDINGS OF FACT:

At the time and place alleged in the petition the military forces of the United States, for the use of the Army, took from said decedent stores and supplies amounting in value at the time of taking to the sum of $19,975.

II.

No allowance is made in said amount for the tobacco, as it does not appear that it was used by the United States; no allowance is made for rent or damages as claimed in said petition, those items not being within the jurisdiction of the court.

BY THE COURT.

Filed January 15, 1894.
A true copy.
Test, this 16th day of January, 1894.
[SEAL.]

JOHN RANDOLPH,
Assistant Clerk Court of Claims.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 342.

IN THE SENATE OF THE UNITED STATES.

APRIL 18, 1894.—Ordered to be printed.

Mr. DANIEL, from the Committee on Claims, submitted the following

REPORT:

[To accompany S. 982.]

The Committee on Claims, to whom was referred the bill (S. 982) entitled "A bill for the relief of Cumberland Female College, of McMinnville, Tenn.," respectfully submit the following report:

This bill was first introduced in the Fifty-first Congress, and in the House of Representatives was referred to the Committee on War Claims and reported with an amendment. (*See* H. R. 2647.)

In the Fifty-second Congress, first session, it was again offered and referred to the Committee on War Claims of the House, reported favorably (H. R. 18), adopted, and passed the House.

In the second session of the Fifty-second Congress it was referred to the Senate Committee on Claims (S. 1349) and passed the Senate. The House nonconcurred in the Senate amendment, a committee on conference was appointed, a conference report was made and agreed to by both Houses of Congress, but the act did not reach the President in time to be signed by him, and failed for this reason to be acted upon.

The committee recommend the passage of the bill with an amendment striking out the words "ten thousand five hundred," in lines 6 and 7 of the bill, and inserting "five thousand," the amount recommended by the conference committee in the Fifty-second Congress, and they adopt the report of the Committee on War Claims of the House of Representatives, Fifty-third Congress, first session, recently made on a similar bill, which is as follows:

[House Report No. 56, Fifty-third Congress, first session.]

The Committee on War Claims, to whom was referred the bill (H. R. 1491) for the relief of Cumberland Female College, of McMinnville, Tenn., submit the following report:

The facts of this claim are fully set forth in a report made by this committee to the House in the Fifty-first Congress, which is as follows:

[House Report No. 2647, Fifty-first Congress, first session.]

The Committee on War Claims, to whom was referred the bill (H. R. 9688) for the relief of Cumberland Female College, submit the following report:

Cumberland Female College, of McMinnville, Tenn., was chartered under the laws of Tennessee in 1851, the cost of the building, etc., being about $25,000. From 1851 to 1861 it was in successful operation. In 1862 the buildings were seized by the Federal forces and converted to hospital use. From its seizure in 1862 until the close of

the war the school grounds and buildings were almost continuously used by the Union Army for hospital purposes, the town of McMinnville being held as a permanent military post. The property was in fine condition when seized in 1862. When the war ended the buildings and grounds were in a badly wrecked condition, the furniture broken and destroyed, and the apparatus almost entirely ruined.

The evidence fully shows that a conservative estimate of the damage to the grounds, buildings, furniture, and apparatus would place the loss at not less than $5,000, and that the further sum of $2,500 would be a moderate compensation for the use and occupation of the premises.

In view of the foregoing your committee recommend the passage of the bill with the following amendment:

In line 6 strike out "ten thousand" and insert in lieu thereof "seven thousand five hundred."

In the Fifty-first Congress this claim was not reached on the calendar, but in the Fifty-second Congress it passed both Houses and went to conference, the two Houses not agreeing as to the amount, and that committee reported as follows:

The committee of conference on the disagreeing votes of the two Houses on the amendment of the Senate to the bill (H. R. 2122) for the relief of Cumberland Female College, of McMinnville, Tenn., having met, after full and free conference have agreed to recommend and do recommend to their respective Houses as follows:

That the Senate recede from its amendments and agree to an amendment, as follows:

Strike out all after the word "appropriated," in line 6, and insert in lieu thereof the following: "The sum of $5,000 for use and occupation of the college buildings and premises as a hospital during the years 1862, 1863, 1864, and 1865, by the military authorities of the United States, and the same to be accepted and receipted for in full of all claims of the said Cumberland Female College against the United States;" and the House agree to the same.

JOHN W. DANIEL,
S. PASCO,
W. A. PEFFER,
Managers on part of Senate.
B. A. ENLOE,
W. J. STONE,
JOHN C. HOUK,
Managers on part of the House.

The conference report was adopted by both Houses, but the act did not reach the outgoing President in time to be signed on March 4, 1893, failing only by an hour or less to become a law.

The committee recommends the passage of the bill (H. R. 1491), with an amendment striking out the words "ten thousand five hundred," in lines 6 and 7 of the bill, and substituting the words "five thousand," the amount recommended by the conference committee of the Fifty-second Congress.

O

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 343.

IN THE SENATE OF THE UNITED STATES.

APRIL 18, 1894.—Ordered to be printed.

Mr. GORMAN, from the Committee on Printing, submitted the following

REPORT:

[To accompany Senate order to bind, under the direction of the Committee on Finance, for the use of the Senate in debate, 200 copies of Report 334, being a comparison in quarto form of bill H. R. 4864 and existing law.]

The Committee on Printing, to whom was referred the accompanying order, having considered the same, report it back with the recommendation that it pass.

The Public Printer estimates the cost at $80.

O

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 344.

IN THE SENATE OF THE UNITED STATES.

APRIL 19, 1894.—Ordered to be printed.

Mr. BERRY, from the Committee on Public Lands, submitted the following

REPORT:

[To accompany S. 1433.]

The Committee on Public Lands, having had under consideration the bill (S. 1433) granting the Hot Springs Water Company a site for a reservoir for cold water upon the permanent reservation at Hot Springs, report the same back with the following amendment:

Strike out all after the enacting clause and insert the following:

That the Secretary of the Interior be, and he is hereby, authorized to lease unto the Hot Springs Water Company, of Hot Springs, Arkansas, its successors and assigns, or to any other person or corporation authorized to supply the city of Hot Springs with cold water for drinking and domestic purposes, a site upon the West Mountain of the Hot Springs Reservation, to be selected by him for the purpose of constructing and maintaining thereon a reservoir for cold water and the pipes necessary to connect the same with the system of water supply of the city of Hot Springs, the term of such lease to be not to exceed twenty years, and the consideration therefor an annual rental of three hundred dollars, to be collected and accounted for as now provided by law in relation to the collection and accounting for of revenue derived from leases of bath-house sites upon the Hot Springs Reservation.

As amended the committee recommend that the bill pass.

EXHIBIT A.

DEPARTMENT OF THE INTERIOR,
Washington, February 8, 1894.

SIR: I am in receipt, by your reference of the 18th ultimo, of Senate bill No. 1433, "Granting the Hot Springs Water Company a site for a reservoir for cold water upon the permanent reservation at Hot Springs," Fifty-third Congress, second session, with request for an expression of my views thereon.

In response thereto I have the honor to state that the corporation mentioned in the bill has heretofore applied to the Department for permission to construct and maintain on a part of the Hot Springs reservation a reservoir for cold water, etc., and upon consideration thereof the conclusion was reached that under proper and reasonable restrictions the desired privilege should be accorded it; an examination of the law, however, bearing upon the case disclosed the fact that the Secretary of the Interior had no authority to permit the use of any portion of the Hot Springs reservation for the purpose desired, and it has therefore sought relief through Congress.

The bill as framed does not meet my approval and its passage is not deemed advisable, inasmuch as it is in the nature of exclusive legislation, is a perpetuity, the grant being without limitation as to time, and is practically unconditional, except as to the approval of the location of the site.

The site desired for the proposed reservoir is upon the Hot Springs Mountain, from which the valuable Hot Springs flow. From information received it will be advisable, in constructing the reservoir, to excavate to a sufficient depth to allow the storage of the water on a level not higher than the surface of the ground on the lower side of the mountain, to preclude the possibility of breaking and danger to life and property. The excavation would have to be made in rock formation and will no doubt require considerable blasting, and as it can not be predicted with any degree of certainty what effect careless blasting would have upon the flow of the water from the springs, the work of the construction should not be permitted, except under the immediate supervision of a representative of the Department on the reservation. Furthermore, as no appropriation is made by Congress for the care and maintenance of the reservation, but such expense is provided for out of the revenues received from the leasing of bath-house sites on the reservation and the rents of hot water furnished to houses off the reservation, it is believed that a reasonable compensation in the nature of ground rent be exacted for the grant of the privilege desired, and that the grantee be required to furnish water necessary for the use of the Army and Navy Hospital and such a quantity as may be necessary for sprinkling from time to time the lawns of the reservation without cost to the United States.

I have therefore to suggest that the bill if passed be first amended so as to provide for the leasing by the Secretary of the Interior of a site on the Hot Springs Reservation to the Hot Springs Water Company of Hot Springs, Ark., its successors and assigns, or any other persons or corporation, upon such conditions as will meet the above objections.

Very respectfully,

HOKE SMITH,
Secretary.

Hon. J. H. BERRY,
Chairman Committee on Public Lands, U. S. Senate.

EXHIBIT B.

DEPARTMENT OF THE INTERIOR,
Washington, April 14, 1894.

SIR: Referring to your personal interview of the 13th instant, at which you stated that the Senate committee having under consideration Senate bill No. 1433, "Granting the Hot Springs Water Company a site for a reservoir for cold water upon the permanent reservation at Hot Springs," desired to place such reservoir upon West Mountain, and inquiring as to whether there were any objections to such site, I transmit herewith a copy of Department telegram of the 13th instant to the superintendent of the Hot Springs Reservation in regard to the matter, together with a copy of his reply thereto, of even date, stating that there is now no local objection to the location of the reservoir on Hot Springs Mountain.

In this connection, however, I have the honor to state that, notwithstanding the opinion of the superintendent of the reservation in this matter, the Department regards the selection of a site on West Mountain as in every way preferable to one on Hot Springs Mountain, the latter (as indicated in Department letter of February 8, 1894, reporting on Senate bill 1433) not being desirable by reason of the possibility of danger to the hot springs flowing therefrom, an objection which is in no way applicable to West Mountain.

Very respectfully,

WM. H. SIMS,
Acting Secretary.

Hon. JAMES H. BERRY,
U. S. Senate.

[Telegram.]

DEPARTMENT OF THE INTERIOR,
Washington, April 13, 1894.

W. J. LITTLE,
Superintendent Hot Springs Reservation, Hot Springs, Ark.:

Senate committee considering Hot Springs Water Company bill desire to place said company's reservoir on West Mountain. How does this impress you in comparison with site on Hot Springs Mountain? Are there any objections? Wire immediately.

WM. H. SIMS,
Acting Secretary.

[Telegram.]

HOT SPRINGS, ARK., *April 13, 1894.*

Hon. WM. H. SIMS,
First Assistant Secretary Interior:

West Mountain not nearly so desirable as site selected on Hot Springs Mountain, which agrees with Stevens's improvements and has no local objection now.

WM. J. LITTLE,
Superintendent.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 345.

IN THE SENATE OF THE UNITED STATES.

APRIL 19, 1894.—Ordered to be printed.

Mr. PASCO, from the Committee on Military Affairs, submitted the following

REPORT:

[To accompany H. R. 4328.]

The Committee on Military Affairs, to whom was referred the bill (H. R. 4328) passed by the House of Representatives for the relief of William B. Chapman, George W. Street, John W. Hoes, Emmet C. Tuthill, and Joseph H. Curtis, have given the same careful consideration and submit the following report thereon:

The above-named persons were in August, 1864, first lieutenants in the Third New York Infantry Volunteers, a regiment then in active service near Hatcher's, Virginia. The colonel commanding the brigade to which this regiment belonged, desiring to improve its discipline, issued an order calling the attention of the officers to the necessity of a strict discharge of their military duties, requiring that schools for the military instruction of officers and noncommissioned officers in the brigade be established, and directing that a full compliance with military regulations be enforced in the different regiments.

These officers declared that they were unable to comply with this order, and promptly sent in their resignations, and they were forwarded through the regular Army channels to the headquarters of the Department of Virginia and North Carolina. Gen. B. F. Butler, who was in command of the Department, regarded this act as a serious breach of military discipline, and on the 21st day of August, 1864, issued a special order in which he severely condemned the conduct of these officers, and ordered that they be dishonorably dismissed the service of the United States with the forfeiture of all pay and allowances. He further ordered that they be set to work under the provost marshal of the Tenth Army Corps until further notice.

The military history of the offenders shows that they had entered the Army at different periods from May 10, 1861, to March 21, 1862, some of them as privates, and that all had gained promotion by their good conduct. With a single exception, they were from 19 to 21 years of age when they were mustered into service. They joined in a letter to the commanding general explaining their conduct, disclaiming all intention of conspiracy, and expressing regret at their hasty course. Friends intervened in their behalf, the harsher features of their punishment were revoked, and they were permitted to return home.

A month later the following order was made at Army headquarters in Chapman's case, and in July, 1865, similar orders were made in behalf of the others:

WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE,
Washington, September 21, 1864.

His Excellency the GOVERNOR OF NEW YORK, *Albany, N. Y.:*

SIR: By direction of the President of the United States the disability resulting from the dismissal of William B. Chapman (formerly a first lieutenant in the Third Regiment New York Volunteer Infantry), by Special Orders, No. 229, headquarters Department of Virginia and North Carolina, August 21, 1864, is hereby removed and he may be recommissioned should your excellency so desire.

Very respectfully, your obedient servant,

THOMAS M. VINCENT,
Assistant Adjutant-General.

Chapman was subsequently again mustered into the service March 13, 1865, as a second lieutenant in the Ninety-first New York Infantry Volunteers, and served as such until July 3, 1865, when he was mustered out with his company. The others did not again enter the army, so far as the records of the War Department show.

The purpose of the act before the committee is to relieve these persons of the stigma attached to their names in consequence of their dishonorable discharge, and to secure for each of them a certificate of honorable discharge as of the date of the order of dismissal. It has been claimed that this was the intention of the above order in Chapman's favor of September 21, 1864, and the subsequent orders of a like tenor in the other cases, but they have not been so interpreted at the War Department.

The necessity for prompt obedience and rigid discipline in an army in active service justifies the order made in this case. But there were mitigating circumstances which can be considered better now than when speedy action was desirable and an immediate example was important when a disposition was manifested to avoid complying with a military order.

The officers were young men; their superiors had been lax in discipline; they feared they could not bring those under their command up to the requirements of the newly promulgated order; they do not seem to have realized that their resignations would be regarded as manifestations of insubordination; they promptly acknowledged their fault and exhibited a proper spirit when put to hard labor under circumstances which were humiliating; they had each made a creditable and honorable military record up to the time of this action; and the committee are informed that they have since lead respectable lives and are worthy men and good citizens.

The committee are of the opinion that they should be relieved of the burden of this stigma, and recommend the passage of the act of the House of Representatives.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 346.

IN THE SENATE OF THE UNITED STATES.

APRIL 19, 1894.—Ordered to be printed.

Mr. PASCO, from the Committee on Claims, submitted the following

REPORT:

[To accompany S. 552.]

The Committee on Claims, to whom was referred the bill (S. 552) for the relief of Calvin Gunn, have carefully considered the same, and submit the following report thereon:

This case has been before the two Houses of Congress since the Fifty-first Congress, and in each House a favorable report was made by the committee to whom it was referred. During that Congress the bill for Mr. Gunn's relief passed the Senate in substantially the form in which it has been introduced in the Senate, but no final action was taken in the House of Representatives.

The history of this case is given very fully in the accompanying communication from the Secretary of the Treasury after he had investigated it in 1886.

It appears that of the amount due Gunn under the law, the sum of $700 was actually turned into the Treasury, and has never been paid to the claimant. The bill provides that he receive this, and the former action of the committee was in his favor. It is just that he should receive this amount, and the committee recommend that the bill do pass.

TREASURY DEPARTMENT, *March 5, 1886.*

SIR: I have the honor to acknowledge the receipt of your letter of the 1st instant, inclosing bill (H. R. 5313) for the relief of Calvin Gunn, and requesting that the Committee on Claims be furnished with all information on file in this Department relating to the same. In reply I have to say that it appears from papers on file in this office that on January 5, 1880, two applications were received from Calvin Gunn asking that informers' shares in two cases be paid to him under section 179 of the act of June 30, 1864 (13 Stat., 305), as amended by the act of July 13, 1866 (14 Stat., 145), which prescribed that the person who should first inform of the cause, matter, or thing whereby a fine, penalty, or forfeiture should be recovered by the Government, should have such share of the same "not exceeding one moiety, nor more than five thousand dollars in any one case," as the Secretary of the Treasury should, by general regulations, provide. Under this authority the Secretary of the Treasury issued a circular August 14, 1866, in which he prescribed that the share of an informer should be 50 per cent on the first $500, 40 per cent on the next $1,500, 30 per cent on the next $2,000, etc.

The two cases in which Mr. Gunn claimed to be the informer were tried and disposed of in the district court of the United States for the eastern district of Missouri,

at the February term, A. D. 1868, and, as appears by the certificate of the clerk of said court on file in this office, were docketed, as follows:

In case No. 1387 of the United States, ex rel. Calvin Gunn, against 30 barrels distilled spirits and the steamboat Lyre, her engines, etc. Information under the internal-revenue laws of the United States.

In case No. 1406 of the United States, ex rel. Calvin Gunn, against 60 gallons distilled spirits et alia. Information under United States internal revenue laws.

I.

In case No. 1387 the clerk of the court certified that the proceeds of sale amounted to $3,184.64, and that the costs amounted to $248.69, leaving $2,935.95.

"Residue of fund to be paid to Barton Able, esq., collector internal revenue, first district of Missouri, to be distributed by him as required by law, in the proportion prescribed, to the United States and to Calvin Gunn, informer."

This certificate was regarded as satisfactory proof of the fact that said court had ascertained and declared Mr. Gunn to be the informer, as required by said section 179 in cases where a court imposed or decreed a fine, penalty, or forfeiture.

It further appears from the certificate of said clerk that said Barton Able, collector of internal revenue, receipted on April 11, 1868, to the registrar of said court for "the sum of $2,935.95, being amount of the fine (forfeiture) in the above-entitled case, in accordance with the order of said court made on the 6th day of April, 1868."

It further appears from a statement of the Commissioner of Internal Revenue on file in this office, "that Collector Able accounted to the United States for the sum of $2,505.17, proceeds of sale in case No. 1387 U. S., ex. rel. Calvin Gunn, *vs.* 30 bbls. distilled spirits, et alia." This amount was not deposited to the credit of the Secretary of the Treasury, but to the credit of the Treasurer of the United States, and was carried into the Treasury in the usual manner.

It will be seen that Collector Able received	$2,935.95
But deposited only	2,505.17
Deficiency	430.78

What disposition was made of this difference has not been explained. Mr. Able died before Mr. Gunn's application was received. Mr. Gunn has filed his statement that he never received any part of the share due him under the law. His share of the whole amount paid to Collector Able would have been $1,130.78, and the share of the United States, $1,805.17; total, $2,935.95.

The whole amount deposited was	$2,505.17
Deduct the Government's share	1,805.17
The portion of informer's share received by the Government	700.00

Even that amount was not paid to Mr. Gunn on his application, because the Secretary of the Treasury held as follows:

"TREASURY DEPARTMENT, *January 17, 1880.*

"It being alleged that this claim accrued in 1868, about eleven years before it was presented to this Department, and it not appearing that claimant has been under any disability to prosecute the same, the presumption is that the claim is unfounded or has been satisfied, and it is therefore rejected."

This rejection seems to have been based upon the assumption that by analogy the statute of limitations was applicable. But as a matter of fact there was no such statute governing cases of this kind, and the right of the Secretary to set up a limitation in such cases was subsequently expressly negatived by the Supreme Court of the United States in the case of Taylor *vs.* United States (104 U. S., 216).

There is no doubt that the entire amount of the informer's share ($1,130.78) should have been paid to Mr. Gunn directly by Collector Able. The question now arises whether the Government should pay him any more than it received ($700) from Mr. Able. On this question I think it hardly necessary for me to express an opinion. I, however, transmit herewith an affidavit made by Mr. Gunn, setting forth the unsuccessful efforts made by him to obtain from Collector Able the amount due him in this case.

II.

In case No. 1406 the clerk of the court certified that the proceeds of sale amounted to	$1,096.69
And that the costs, etc., amounted to	643.90
Leaving	452.79

"Residue ordered to be paid to Barton Able, esq., collector internal revenue first district of Missouri, to be by him distributed to the use of the United States, and to Calvin Gunn, informer herein, in the proportions as prescribed by law."

It further appears, from the certificate of said clerk, that said Barton Able, collector of internal revenue, receipted on the 17th day of June, 1868, to the registrar of said court for "the sum of $452.79, being the amount of the residue of fine (forfeiture) in the above-entitled case, in accordance with the order of said court, made on the 16th day of June, 1868."

It further appears from a statement of the Commissioner of Internal Revenue, on file in this office, that said Barton Able "accounted to the United States for its share ($226.39) of the proceeds in case No. 1406 U. S. Ex rel. Calvin Gunn *vs.* Sixty Gallons Distilled Spirits." What disposition was made of the other half of the sum received by Mr. Able in this case under the order of the court has not been explained, though Mr. Gunn alleged in his application that he had "never received, or been paid, any portion of the moiety due him in said case as informer." Mr. Gunn's claim in this case was not allowed by the Secretary, because only the share of the Government had been deposited with the United States Treasurer.

In connection with this point I would refer the committee to the language of said section 179, which says "that no right accrues to, or is vested in, any informer in any case until the fine, penalty, or forfeiture in such case is fixed by judgment or compromise, and the amount or proceeds shall have been *paid*, when the informer shall become entitled to his legal share of the sum adjudged or agreed upon and *received*."

In this case the proceeds were paid into court, and by order of the court to the collector of internal revenue. Whether the money should have been placed in the Treasury, or to the credit of the Secretary, in order to fix the liability of the Government to pay the informer his share, is for the committee to decide.

Respectfully, yours,

D. MANNING,
Secretary.

Hon. WM. WARNER,
Committee on Claims, House of Representatives.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 347.

IN THE SENATE OF THE UNITED STATES.

APRIL 20, 1894.—Ordered to be printed.

Mr. GORMAN, from the Committee on Printing, submitted the following

REPORT:

[To accompany House concurrent resolution to print 8,000 copies of the eulogies delivered in Congress upon the late Representative W. H. Enochs, to be distributed as usual.]

The Committee on Printing, to whom was referred the accompanying concurrent resolution, having considered the same, report it back without amendment and recommend its passage.

The Public Printer estimates its cost at $2,625.

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53D CONGRESS, } SENATE. { REPORT
2d Session. } { No. 348.

IN THE SENATE OF THE UNITED STATES.

APRIL 20, 1894.—Ordered to be printed.

Mr. ALLEN, from the Committee on Claims, submitted the following

REPORT:

[To accompany S. 1301.]

The Senate Committee on Claims, to whom was referred the bill (S. 1301) for the relief of the legal representatives of Hiram Somerville, beg leave to submit the following report:

This bill was considered in the House of Representatives by the Committee on War Claims at the first session of the Fifty-second Congress and was recommended for passage in the sum of $650. It was considered in the Senate by the Committee on Claims at the same session of the Fifty-second Congress and recommended for passage in the sum of $250. We have examined the claim with some degree of care and are of the opinion that it should be allowed in the sum of $505, this appearing to be the loss sustained by the claimant, for which we believe the Government to be justly and equitably reliable.

Your committee, therefore, report the bill back favorably, with the amendment that the words "seven hundred and fifty-five" in line 3 be stricken out and the words "five hundred and five" be inserted in lieu thereof, so that the bill will read: "That the sum of five hundred and five dollars be, and the same is, hereby appropriated," etc.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 349.

IN THE SENATE OF THE UNITED STATES.

APRIL 20, 1894.—Ordered to be printed.

Mr. MCPHERSON, from the Committee on Naval Affairs, submitted the following

REPORT:

[To accompany S. 1779.]

The Committee on Naval Affairs, to whom was referred the bill (S. 1779) authorizing certain officers of the Navy to administer oaths, have carefully considered the same, and recommend that it pass.

The letter of the Secretary of the Navy in relation to the necessity for the passage of the bill is hereto attached.

NAVY DEPARTMENT, *Washington, March 15, 1894.*

SIR: I have the honor to transmit herewith a draft of a bill, entitled "A bill authorizing certain officers of the Navy to administer oaths."

In the administration of the affairs of this Department it frequently becomes necessary to propound certain questions to officers which are to be answered under oath, and it often happens that the ships upon which these officers are stationed are at such a distance from any place where there is an officer empowered to administer oaths that the interests of justice are much delayed. Furthermore, in the examination of officers for promotion and retirement interrogatories are sent to other officers to be answered under oath, and as these amount to quite a number every year, and as the fees allowed to notaries public and others for administering oaths vary in the different States, many of them being very large, a considerable expenditure of money is necessary for this purpose.

For these reasons it is believed that, both in the interests of economy and convenience, the passage of the within bill will be of material advantage to the service, and I therefore earnestly recommend it to the favorable consideration of the Committee on Naval Affairs of the Senate.

Very respectfully,

H. A. HERBERT,
Secretary of the Navy.

Hon. JOHN R. MCPHERSON,
Chairman Committee on Naval Affairs, U. S. Senate.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 350.

IN THE SENATE OF THE UNITED STATES.

APRIL 20, 1894.—Ordered to be printed.

Mr. MCPHERSON, from the Committee on Naval Affairs, submitted the following

REPORT:

[To accompany S. 1784.]

The Committee on Naval Affairs, to whom was referred the bill (S. 1784) to amend section 3719 of the Revised Statutes, having carefully considered the same recommend that the bill do pass with the following amendment:

In line 10, after the word "check," insert the words "drawn upon a national bank."

The annexed letter of the acting Secretary of the Navy in relation to the need of the passage of the bill is submitted.

NAVY DEPARTMENT,
Washington, March 14, 1894.

SIR: I have the honor to invite your attention to section 3719 of the Revised Statutes, which provides that every proposal for naval supplies invited by the Secretary of the Navy * * * shall be accompanied by a written guaranty, signed by one or more responsible persons, to the effect that he or they undertake that the bidder, if his bid be accepted, will, at such times as may be prescribed by the Secretary of the Navy, give bond, with good and sufficient sureties, to furnish the supplies proposed; and no proposal shall be considered unless accompanied by such guaranty; and to the report of the Secretary of the Navy, dated November 18, 1893, in which, on page 54, under the heading "Certified checks," it is recommended that the provisions contained in the above-mentioned section be so far modified as to allow the Department to accept, instead of the guaranty required to accompany proposals, and instead of the bonds required with the contracts, certified checks for an amount equal to the price to be paid under the contract.

I inclose herewith a draft of a bill providing for the amendment of section 3719 in the particular mentioned, and request that this matter receive the attention of the committee at an early date, and that the necessary action be taken to have the measure adopted.

Many of the contracts entered into by the Department for furnishing naval supplies for which proposals are submitted under the section of the Revised Statutes herein referred to involve only small amounts, ranging from $25 or less upwards, and, inasmuch as there is some expense and a considerable amount of trouble incident to the execution of a guaranty by two or more persons to accompany proposals in such cases, and of a bond for the fulfillment of the contract, it often happens that dealers who would otherwise submit bids for furnishing articles of the kind required in any particular case are unwilling to bear the expense and take the trouble necessary to secure guarantors on their proposals and sureties on bonds, where the contract price is very small, and the Government is thus often deprived

of the advantage that might arise from more extensive competition, and is obliged to pay indirectly a part of the cost of the execution of the papers.

If the Department were allowed to accept certified checks in lieu of guaranties and bonds, as above recommended, the interests of the Government would be amply protected so far as the question of surety is concerned, and all the advantages to be derived from competition would be secured without incurring any additional expense, and the clerical duties to be performed in some of the bureaus and offices of the Department would be diminished to no inconsiderable extent—a result very much desired.

Very respectfully,

W. McADOO,
Acting Secretary of the Navy.

Hon. JOHN R. MCPHERSON,
Chairman Committee on Naval Affairs, U. S. Senate.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 351.

IN THE SENATE OF THE UNITED STATES.

APRIL 24, 1894.—Ordered to be printed.

Mr. PALMER, from the Committee on Pensions, submitted the following

REPORT:

[To accompany S. 879.]

The Committee on Pensions, to whom was referred the bill (S. 879) granting a pension to Josephine F. Kelton, widow of Brig. Gen. J. C. Kelton, late Adjutant-General U. S. Army, deceased, have examined the same and report said bill with an amendment, as follows:

Amend line 8 by striking out the words "one hundred" and inserting in lieu thereof the word "fifty."

Your committee recommend the passage of the bill as amended and submit herewith the statement of the Assistant Adjutant-General as a part of this report.

Military career of Brig. Gen. John C. Kelton, U. S. Army.

WASHINGTON, D. C., *August, 1893.*

The ADJUTANT-GENERAL,
U. S. Army:

SIR: Understanding that a bill will be introduced in both Houses of Congress granting a special pension to the widow of Gen. John C. Kelton, at one time Adjutant-General of the U. S. Army, and Governor of the "Soldiers' Home" at the time of his death, and that the Committees on Pensions of the said Houses will probably call upon you for a statement of Gen. Kelton's services, I have the honor to request that the following, which is based on original or officially authenticated documents, be submitted as supplementary to such statement:

It appears that Gen. Kelton's military career was from beginning to end an exceptionally brilliant one. In January, 1858, Col. Francis Lee, who had been Gen. (then Lieutenant) Kelton's immediate commanding officer during the three years following his graduation, recommended him to the President as worthy of special advancement, and Lieut. Col. W. J. Hardee, commandant of cadets at the Military Academy, said of him in a communication written about the same time and which likewise presented his name for promotion in recognition of his meritorious services at the Academy (where he originated and developed the branch of instruction known as military gymnastics), that he "is one of the most zealous, active, and efficient officers I have ever known."

His record during the late war of the rebellion is conspicuously meritorious. Appointed to the Adjutant-General's Department at the outbreak of the rebellion, he commanded, as colonel of the Ninth Missouri Volunteers, a brigade in the field until November 21, 1861. Resuming his staff duties, first as adjutant-general of the Department of the Missouri and later on of the Department of the Mississippi, he took part in the advance upon as well as in the siege and occupation of Corinth. On July 17, 1862, he became the adjutant-general of Maj. Gen. Halleck, on whose staff while General-in-chief of the Armies of the United States, chief of staff of said Armies, and finally as commander of the Division of the James. he continued to be a prominent figure throughout the war.

A mere outline even of the important services he rendered to his country during this trying period of its history would far exceed the limits of this letter; those only

who are familiar with the conduct of military operations know how much of the labor, mental strain, and anxiety incident thereto fall upon the adjutant-general of a command. Bvt. Maj. Gen. Cullum, his associate on Gen. Halleck's staff, speaks of him as a "zealous, untiring, able, and systematic adjutant-general."

Of the great leaders of the late war who were intimately acquainted with Gen. Kelton, Gen. W. T. Sherman, in a letter addressed to the President, February 5, 1888, says he knows enough of him "that is good to fill a volume," a high tribute from one not given to extravagance in praise; and Gen. Philip H. Sheridan, in a communication likewise addressed to the President, gives to Gen. Kelton the credit of having placed him (Sheridan) in a position that "gave him afterwards such honor and rank in his Army," a statement in itself sufficient to entitle Gen. Kelton to the lasting gratitude of the country. The worth of Gen. Kelton's services the Government recognized by bestowing upon him at the close of the rebellion the brevet of lieutenant-colonel, colonel, and brigadier-general, for "most valuable and arduous services during the rebellion both in the field and at headquarters."

After serving as chief of the appointment branch of the Adjutant-General's Office from July 1, 1865, to July 28, 1870, he became, and continued to be until 1885, the adjutant-general of the Division of the Pacific and Department of California, during which period he not only discharged the arduous duties legitimately pertaining to his office in a highly satisfactory manner, but also succeeded in giving an impetus to rifle-firing which has contributed much to the excellence in marksmanship for which our Army is now noted, and in securing the adoption by the Ordnance Department of several valuable improvements in small arms of which he was the inventor. Recalled to Washington on October 1, 1885, he acted as the principal assistant in the Adjutant-General's Office until, on June 7, 1889, the President commissioned him as Adjutant-General of the U. S. Army, the functions of which high office he exchanged on June 24, 1892, the date of his retirement by operation of law, with those of the Governor of the Soldiers' Home, near this city, where, regardless of the inroads of disease that was fast making upon his life, he continued in the beneficent discharge of his trust up to almost the very hour of his death.

The accompanying sketch of his life, contained in the Army and Navy Register of June 25, 1892, describes at considerable length the achievements of Gen. Kelton, especially as chief of the Adjutant-General's Department, but the esteem in which he was held as an officer of that Department by the great generals of our Army is best shown by extracts from letters now before me bearing their signatures.

Gen. Sherman, in the letter already mentioned, expresses his opinion of him in the following language: "He has been in the military service continuously since 1847, and in the vicissitudes of service we often came together, giving me fair opportunities to observe his character. Always the perfect gentleman of high intellect, serving others rather than himself, an adjutant faithful to his chief, and yet gentle and courteous to his inferiors, often dealing with men of strong natures, he harmonized instead of antagonizing them. In several instances he might have played a more ambitious rôle, but he clung to his immediate sphere of faithfulness and duty. By encouraging such self-sacrificing officers the United States will add to its claim to perpetuity."

Lieut. Gen. Sheridan, while General-in-Chief of the U. S. Army, gauged his professional efficiency in these words: "There is no man in the service who has devoted himself more to the duties of his profession than Gen. Kelton, and in all the situations he has held during and since the war he has given satisfaction. As an officer of the Adjutant-General's Department he has been on the highest plane of official excellence, competent and agreeable."

Maj. Gen. Schofield says that "a personal acquaintance of many years and the closest official relations of several years' duration have enabled me to say that Gen. Kelton is unsurpassed by any in unselfish fidelity and attention to official duty."

Maj. Gen. Howard, after speaking of Gen. Kelton's "grand public services," pays this tribute to his memory: "I have always had a sincere affection for Gen. Kelton. That he did his duty with phenomenal fidelity is known to all the Army, and I hope will be to all the world that has had any care for the life of this country."

With Gen. Kelton's services since the war the Army of the present day is familiar. His self-sacrificing devotion to duty and his efforts to ameliorate the condition of the enlisted soldier never relaxed up to the very day of his death. His high aims and high standings present a military record of rare splendor, well worthy of emulation. In connection with this brilliant career during the war of the rebellion and his distinguished services as a young officer prior to said war constitutes a strong claim upon the gratitude of the nation which it is hoped Congress will be prompt to recognize by making liberal provision for his widow and helpless children.

Very respectfully,

THEO. SCHWAN,
Assistant Adjutant-General.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 352.

IN THE SENATE OF THE UNITED STATES.

APRIL 24, 1894.—Ordered to be printed.

Mr. PALMER, from the Committee on Pensions, submitted the following

REPORT:

[To accompany S. 1542.]

The Committee on Pensions, to whom was referred the bill (S. 1542) to amend section 4746 Revised Statutes of the United States, having examined said bill, report the same with an amendment, as follows:

Amend line 11 by striking out the words "or assist in the making."

Your committee recommend the passage of the bill as amended, and submit the accompanying correspondence as a part of this report.

DEPARTMENT OF THE INTERIOR,
Washington, January 29, 1894.

SIR: I transmit herewith a draft of a proposed amendment of section 4746 Revised Statutes United States, prepared by the Commissioner of Pensions, together with a copy of a letter from that officer, dated the 11th instant, setting forth his reasons in detail as to why the same should become a law.

There seems to be need for this legislation, and concurring in the suggestions of the Commissioner I have the honor to recommend that the proposed amendment be adopted.

Very respectfully,

HOKE SMITH,
Secretary.

The CHAIRMAN OF THE COMMITTEE ON PENSIONS,
U. S. Senate.

DEPARTMENT OF THE INTERIOR, BUREAU OF PENSIONS,
Washington, D. C., January 11, 1894.

SIR: I inclose herewith the draft of a proposed amendment of section 4746, Revised Statutes of the United States. In asking that you recommend such legislation to Congress, I desire to state the impelling reasons therefor.

Postdating vouchers has become a continually recurring offense of such wide extent as to occasion very serious embarrassment to the U. S. pension agents and to this Bureau. Many notaries and other executing officers have made it a habit to postdate vouchers; sometimes in order that they might the earlier be received at the pension agency and more promptly paid, but more frequently in cases where the voucher being in the hands of a notary has been signed at some period long antecedent the regular quarter day. This frequently occurs where certificates have been hypothecated, in violation of law, as security for loans, the borrower in such cases signing the voucher in blank and leaving it with the lender,

through whose act or instrumentality the jurat of the executing officer is afterwards attached, as though the pensioner were corporeally present to sign and execute the same.

Under the former administration many such cases occurred. In a single community the number of postdated vouchers for a particular quarter day amounted to several hundred. Various prosecutions were proposed by this Bureau for violation of the law, and on July 30, 1891, the Attorney-General, Hon. W. H. H. Miller, advised the Secretary of the Interior that in his judgment the statute was inoperative to punish such a case. I inclose you herewith a copy of the letter from the Attorney-General, setting forth the grounds for his belief that section 4746, Revised Statutes of the United States, is insufficient to meet such a case. I think that upon examination of the section it will be seen that this objection is well taken. Unquestionably, the statute should be so framed as to accomplish the purpose which was within the intention of the Legislature, to wit, to prevent postdating of vouchers, and to punish those who contribute thereto.

The only redress within the power of this Bureau is in the nature of a letter to offending magistrates pointing out the danger with which such a practice is fraught and requesting them to desist therefrom. The object of the execution of the voucher on a given day, under the conditions named in section 4764 of the Revised Statutes, is to insure the fact that the pensioner is alive at that time. Were the voucher postdated, the real beneficiary might die, as indeed has at times occurred, between the time of such actual signing and the quarter day to which postdated. The section relative thereto is defective in this, that it only punishes one who presents or causes to be presented at a pension agency.

The contemplated amendment as provided in the draft herewith forwarded will include the making or causing to be made, or aiding or assisting in the making, of a postdated paper required as a voucher in drawing a pension, and will thus include the very feature of the offense which, under the opinion of the Attorney-General, it is now inoperative to reach.

Very respectfully,

WM. LOCHREN,
Commissioner.

Hon. HOKE SMITH,
Secretary of the Interior.

DEPARTMENT OF JUSTICE,
Washington, D. C., July 30, 1891.

SIR: Referring to your letter of the 11th instant, I return herewith pension papers in cases certificate 282813, of Josephine Link; certificate 6829 (Navy), of Robert Frost; and certificate 184041, of Edward O'Shea. These papers were transmitted to me with a view to action against certain notaries and against the claimant, Edward O'Shea, under section 4746, Rev. Stat. U. S. Upon examination of this statute, it has seemed to me it does not cover the action of a notary who merely attaches his jurat to a postdated voucher. The words of the statute which come nearest do not seem to me to include such an act. I do not think that a notary so acting could be held to "knowingly and willfully present or cause to be presented at any pension agency any power of attorney or other paper required as a voucher in drawing a pension, which paper bears a date subsequent to that on which it was actually signed or executed."

I do not think that the attaching the jurat is "presenting" or "causing to be presented." There is one defendant among those suggested, namely, Edward O'Shea, who doubtless presented, or caused to be presented, the voucher, and it seems clear he could be prosecuted, but as your principal object seems to be to administer an admonition to notaries public I think it best to advise you of my opinion that the statute is insufficient for any such purpose. If any frauds were perpetrated on the Government by means of a post-dated voucher, evidently the attaching of the notary's jurat would be an act which would go far to establish such notary's complicity in a conspiracy, although it might not, by any means, be sufficient or conclusive of itself. I surmise that in this case there would be no possibility of establishing the conspiracy, and indeed, from the papers, I do not discover that any fraud was perpetrated. If you desire a prosecution of the claimant, Edward O'Shea, I shall transmit the papers on their return to the U. S. attorney for his action.

Respectfully,

W. H. MILLER,
Attorney-General.

The SECRETARY OF THE INTERIOR.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 353.

IN THE SENATE OF THE UNITED STATES.

APRIL 25, 1894.—Ordered to be printed.

Mr. WILSON, from the Committee on the Judiciary, submitted the following

REPORT:

[To accompany S. 1252.]

The Committee on the Judiciary, to whom was referred the bill (S. 1252) to amend an act entitled "An act to provide for the times and places to hold terms of the United States courts in the State of Washington," have considered the same and respectfully report it back to the Senate with an amendment, as follows, viz:

Strike out of line 82 in section 6 the words, "had the said existing statute not been passed," and insert instead thereof the following words, "as if the same were returnable to or pending in the terms of said courts provided for by this act."

And the committee recommend the passage of the bill when thus amended.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 354.

IN THE SENATE OF THE UNITED STATES.

APRIL 25, 1894.—Ordered to be printed.

Mr. MITCHELL, of Oregon, from the Committee on Claims, submitted the following

REPORT:

[To accompany S. 557.]

The Committee on Claims, to whom was referred the bill (S. 557) for the relief of George F. Roberts, administrator of the estate of William B. Thayer, deceased, surviving partner of Thayer Brothers and others, having had the same under consideration, submit the following report:

A similar bill has been reported heretofore several times favorably from this committee, and has passed the Senate some three times. At the first session of the Fifty-second Congress a report, No. 79, was submitted. Your committee readopt said report, and report back said bill (S. 557) without amendment, and recommend its passage.

[Senate Report No. 79, Fifty-second Congress, first session.]

The Committee on Claims, to whom was referred the bill (S. 352) for the relief of George F. Roberts, administrator of the estate of William B. Thayer, deceased, surviving partner of Thayer Brothers, and others, having had the same under consideration, submit the following report:

A similar bill was before this committee at the first session of the Fiftieth Congress, at which time the following report was agreed to, being Report No. 94 of that session:

The Committee on Claims, to whom was referred bill (S. 394) for the relief of George F. Roberts, administrater of the estate of William B. Thayer, deceased, surviving partner of Thayer Brothers, and others, having had the same under consideration, submit the following report:

A similar bill was before this committee at the first session of the Forty-ninth Congress, at which time the following report was adopted; which was also agreed to in the first session of the Fiftieth Congress, being Report No. 279:

Thayer Brothers, Pate & Co., and J. W. Gaff & Co., in the year 1864, had deposited a large quantity of distilled spirits in a United States bonded warehouse, then under the control of officers of the Government charged with the collection of the internal revenue. That it further appears that the quantity so deposited is correctly stated in the petition of said parties filed with said bill; that it further appears that the quantity originally deposited is correctly stated, as is also the quantity withdrawn; and that during the time said spirits were so deposited, and the time at which the said spirits were withdrawn, there was a percentage of leakage, whereby, as is shown in the case of Thayer Brothers, there is a loss of 7,193.53 gallons; in the case of Pate & Co., a loss of 13,272 gallons; and in the case of J. W. Gaff & Co., a loss of 9,375 gallons. And that it further appears, under direction of the Commissioner of Internal Revenue, these parties severally paid the tax required by law on the quantity

originally deposited, without regard to fact of loss by leakage in the year 1867; and that against this said parties then and ever since protested in mode and manner as from time to time they have been advised was best to secure relief, their last resort being to Congress for such relief; their appeal being a protest that such collection of taxes was against a proper construction of the act of Congress, June 30, 1864 (section 55), and was against the practice and rulings of the Internal Revenue Office.

Under this enforced collection of taxes upon the quantity lost whilst in the custody of the Government it is claimed, and shown by the proof correctly claimed, that Thayer Bros. paid $10,790.32, Pate & Co. paid $19,662.19, and J. W. Gaff & Co. paid $14,062.50.

There is no question about the facts involved, but there is one as to the proper construction of the act of Congress referred to.

Section 55 of act of Congress approved June 30, 1864, enacts "that in addition to the duties payable for licenses herein provided, there shall be levied, collected, and paid on all spirits that may be distilled and sold, or distilled and removed for consumption or sale of first proof, on and after the 1st day of July, 1864, and prior to the 1st day of February, 1865, a duty of one dollar and fifty cents on each and every gallon." (13 U. S. Stat. L., 243.)

The rules and regulations prescribed by the Commissioner of Internal Revenue, with the sanction of the Secretary of the Treasury, and as acted on by the office and by subsequent Commissioners and Secretaries, notably Secretary Sherman and Commissioner Raum, show, in the language of Secretary Sherman (of date November 14, 1877):

"There can be no doubt that the assessments for leakage were erroneous and improper."

This in the Whalley case, where the tax was refunded.

The decisions of the Supreme Court sustain the efficacy of power of rules so made and acted on. These facts and law, taken in connection with the decision of the Supreme Court in Lillenthal *v.* United States, 1877 (97 U. S., 268), which, in construing a different section of a same act of Congress, by analogy and logic settle the proper construction of section 55 and support the opinion of Secretary Sherman that the assessment of taxes in such a case as the pending one was erroneous, and hence this committee believes that the taxes collected as aforesaid were illegally collected and should be refunded.

In this conclusion they are supported by favorable reports made from time to time from committees in the House of Representatives, one of which, because of its fullness in detailing the facts, etc., of these cases, they here refer to and adopt as a part of this report, to wit, the report of Mr. Howard, Forty-ninth Congress, first session, H. R. No. 1122. (See Appendix A.)

Your committee add that the same question involved herein was presented under Senate bill No. 1839 (old bill 520), for relief of Richard C. Ridgeway and others, and a report made thereon by Hon. H. E. Jackson in behalf of this committee, and, as thus giving the views of this committee, is here and now referred to as persuasive. (See Senate Report No. 219, first session Forty-ninth Congress.)

APPENDIX A.

[House Report No. 1122, Forty-ninth Congress, first session.]

The Committee on Claims, to whom was referred the bill (H. R. 1264) for relief of George F. Roberts, administrator of Thayer Brothers, Silas Q. Howe, surviving partner of W. T. Pate & Co., and Henry W. Smith, surviving partner of T. and J. W. Gaff & Co., have had the same under consideration, and now report it back to the House with the recommendation that it be passed.

The report made by the Committee on Ways and Means of the Forty-eighth Congress, second session, states the facts connected with the claim of Thayer Brothers, and your committee adopt the same.

The material facts in the case of Thayer Brothers are that, during the period from July 1 to December 31, 1864, they deposited in a bonded warehouse in the fifth district of Illinois, which was under the control of the collector and the storekeeper, 3,100 barrels of distilled spirits, containing when deposited, as shown by the certificates of the inspector, 190,182·12 gallons; that when said barrels were withdrawn and reinspected there were, as shown by the reinspection, only 182,988·58 gallons, making an actual loss while in said warehouse of 7,193·53 gallons; that they were required by the collector to pay the tax of $1.50 per gallon upon the quantity placed in the bonded warehouse, making the tax paid on the quantity lost by leakage while in warehouse $10,790.32. They filed their affidavit on the regular form (46) with the Commissioner of Internal Revenue for a refund of said tax July 18, 1867, averring the facts to be as above stated, and that the tax paid on the quantity lost by

leakage while in warehouse was illegal, erroneous, and improper, and ought to be refunded, and to this affidavit was affixed the certificates of the proper internal-revenue officers.

The assistant assessor certified to the facts as follows:

ASSISTANT ASSESSOR'S CERTIFICATE.

I hereby certify that I have carefully investigated the facts set forth in the within affidavit, and that I believe the statements to be in all respects just and true.

August 22, 1867.

THOMAS ELLIS,
Assistant Assessor, Fourth Division, Fifth District.

The assessor also certified to the facts as follows:

ASSESSOR'S CERTIFICATE.

I hereby certify that I have carefully investigated the facts set forth in the within affidavit of William B. Thayer, and that I believe the statements to be in all respects just and true; and I further certify that, from present personal examination, I find the sum of $10,790.32 is part of $432,976.09 reported against the said Thayer Brothers on page 1, line 15 of the list on form 60, for December, 1864, now on file in my office, and that the tax is included in the collector's aggregate receipt for the said list transmitted by me to the Commissioner of Internal Revenue, and that the claim has not heretofore been allowed in any form. Said receipt amounts to $713,632.23.

September 10, 1867.

GEORGE I. BERGEN,
Assessor, Fifth District, Illinois.

The collector of the district at the time the tax was paid certifies as follows:

COLLECTOR'S CERTIFICATE.

I hereby certify that I have carefully investigated the facts set forth in the within affidavit and am satisfied that the statements are in all respects just and true; and I further certify, upon personal examination, that the name of the claimant and the amount claimed are found reported on Form 60, for December, 1864, now on file in my office, and that the same was paid to me on the 20th, 23d, 24th, 28th, 30th and 31st days of December, 1864, and are included in my aggregate receipt for said list, the receipt amounting to $713,632.23, delivered to the assessor to be transmitted to the Commissioner of Internal Revenue.

September 11, 1867.

JOHN H. BRYANT,
Late Collector, Fifth District, Illinois.

The United States inspector for said district during the time such spirits were stored in the bonded warehouse swears that he had in charge the bonded warehouse of Thayer Brothers, as the United States storekeeper, and said spirits were under his control and in his possession; that he personally inspected and reinspected said spirits, and that he was present when they were deposited in the bonded warehouse, and also present when they were withdrawn from said bonded warehouse; that there were deposited in said warehouse from July 1, 1864, to December 31, 1864, 190,182·12 gallons, making the tax paid $285,273.18, which included the leakage, and that the quantity actually withdrawn was only 182,988·50 gallons; showing by actual gauging that the quantity lost by actual leakage and evaporation while said spirits were stored in said bonded warehouse, and while under his control and in his possession, was 7,190·50 gallons, and that the tax paid upon the quantity so lost by leakage and evaporation was $1.50 per gallon, and amounted to $10,790.32, and paid upon the identical spirits in which the leakage, evaporation, and soakage occurred. His tabular statement shows in detail the quantity inspected and reinspected. This claim was, by the Commissioner of Internal Revenue, June 13, 1868, suspended until a decision should be had in the similar claim of Pate & Co., and the Commissioner of Internal Revenue did not take action in this similar claim of Pate & Co. until May 18, 1882, when he recommended that this claim of Pate & Co. be allowed and paid. These claimants, or their legal representatives, have been almost constantly urging its allowance, either before the departments, the courts, or Congress, ever since the same was assessed and collected. The Committee on Ways and Means of the Forty-eighth Congress unanimously recommended the payment of this claim, and reported a bill for its payment. Your committee therefore recommend the passage of the accompanying bill.

In the claim of Silas Q. Howe, surviving partner of W. T. Pate & Co., the material facts are, that during the period from July 1 to December 31, 1864, Pate & Co. depos-

ited in a bonded warehouse in the third district of Indiana, which was under the control of the collector and storekeeper, 4,196 barrels of distilled spirits, containing when deposited, as shown by the certificate of the gauger's inspection, 213,885½ proof gallons; that when said barrels were withdrawn, upon reinspections and regauge, there were only 200,613½ proof gallons, making the actual loss 13,272 proof gallons; that the collector required them to pay the tax of $1.50 per gallon upon the quantity deposited in the bonded warehouse, making the tax paid upon the quantity lost by actual leakage while in bonded warehouse $19,908.

On the 26th day of October, A. D. 1866, and on the 27th day of July, A. D. 1871, they filed with the Commissioner of Internal Revenue their affidavit, on the regular Treasury form 46, averring that the facts were as above stated, and that the tax paid upon the quantity lost by leakage while in bonded warehouse was illegal, erroneous, and improper, and ought to be refunded; to these affidavits were affixed the certificates of the proper internal-revenue officer in corroboration of the aforesaid facts.

J. S. Smith Hunter, the collector of internal revenue at the time said spirits were in bonded warehouse, in his deposition filed in the Court of Claims, testifies that he was collector of internal revenue from July 1 to December 31, 1864; that during said time Pate & Co. deposited in bonded warehouses, approved by him, 213,885½ proof gallons; that on the 15th, 25th, and 30th days of December, 1864, he required the tax of $1.50 per gallon to be paid on all the spirits stored in the warehouse, amounting to $320,828.25, which sum he paid over to the United States; that said bonded warehouses were under his control and subject to his orders all the time said spirits were stored. (See printed deposition.)

The deposition of S. Q. Howe, October 2, 1867, proves the quantity deposited, withdrawn, leakage, and tax paid to be as before stated. (See printed record.) The deposition of W. T. Pate, taken at same time, proves the facts to be as stated and that the cooperage was bad. William Emerson, in his deposition, swears that the cooperage was bad.

The United States inspector or gauger, in his deposition taken October 1, 1867, and his affidavit of date of June 10, 1868, swears that in person he inspected or gauged all the spirits distilled by Pate & Co. from July 1 to December 31, 1864; that the bonded warehouse was in his custody, and the spirits in his possession as United States storekeeper; that he was present during the time aforesaid, and Pate & Co. deposited 4,196 barrels of distilled spirits, containing 213,885½ gallons, first proof, in bonded warehouse, and the tax paid thereon amounted to $320,828.25; that in December, 1864, he was present when the same were withdrawn from bonded warehouse; that he in person reinspected or regauged the 4,196 barrels aforesaid, and they only contained 200,613½ proof gallons; that the quantity lost by leakage and evaporation was 13,272 gallons proof spirits; that the cooperage was bad, and that the tax was paid after the evaporation had occurred in the quantity deposited, including the quantity lost by leakage.

In his detailed statement, dated June 10, 1868, giving the inspections or gaugings, and the reinspection or regauges, the same shows that 13,272 gallons, first proof, was lost while in bonded warehouse; and in his affidavits of April 17 and 27, 1882, he gives the manner how he inspected and reinspected, and that the instruments used were those provided by the United States Government, and that the leakage stated in his affidavit of June 10, 1868, actually occurred, and that W. T. Pate & Co. lost the whisky and paid the tax upon it besides; that he was particular in gauging and regauging.

To the application, verified by affidavit of W. T. Pate, setting forth the facts as stated, dated August 31, 1870, and filed with the Commissioner of Internal Revenue, the collector at the time said tax was assessed and collected affixed his certificate thereto as follows:

COLLECTOR'S CERTIFICATE.

I hereby certify that I have carefully investigated the facts in the within affidavit, and am satisfied that the statements are in all respects just and true; and I further certify upon personal examination that the name of the claimant and the amount claimed are found reported on page 1, line 1, of the list, on form 60, for December, 1864, heretofore and now on file in my office, and that the same was paid to me on the 15th, 25th, and 30th days of December, 1864, and are included in my aggregate report on form 60, which aggregate amounted to $350,957.62, which were delivered to the assessor to be transmitted to the Commissioner of Internal Revenue on or about the 23d day of January, 1865, and that the sum collected in said month from W. T. Pate & Co., and reported as aforesaid, amounted to $320,828.25.

J. S. Smith Hunter,
Late Collector Third District, Indiana.

Bloomington, Ind., *July 28, 1871.*

On the back of the application for a refund, verified by affidavits filed in the Internal-Revenue Office, July 27, 1871, was indorsed:

"Examined and submitted for allowance July 7, 1880, by Breckenridge, who was chief of the refunding division."

The Commissioner of Internal Revenue, Gen. Green B. Raum, in person examined this claim, and in his letter, dated May 18, 1882, says:

"Pate & Co., from July 1 to December 31, 1864, deposited in bonded warehouse 4,186 barrels distilled spirits, containing 213,885½ gallons proof spirits; when these packages were removed from warehouse they contained, by actual inspection, only 200,613½ proof gallons. This tax of $1.50 was collected on full quantity deposited, amounting to $320,828.25. The tax due on the 200,613½ gallons actually found in the packages on withdrawal was $300,920.25, showing an excess of $19,908 collected. In computing the leakage in transit, the sum of $245.81 was computed on the full quantity bonded. I propose to allow the claim for the remainder of the tax appearing to have been paid by these claimants in December, 1864, as set forth, on spirits lost by leakage and evaporation while stored in bonded warehouse, to wit, $19,662.19.

"Very respectfully, your obedient servant,

"GREEN B. RAUM,
"*Commissioner.*"

There is a great deal of other evidence in the record not necessary to be stated here, as it merely corroborates that of the assessor, collector, and inspector. Upon this testimony, and after a very careful examination of all the facts contained in this voluminous record before us, the committee are of the opinion that there was an erroneous assessment and collection of $19,662.19, and that it ought to be refunded as recommended by the Commissioner of Internal Revenue. The claimants have been continually urging a refund ever since said sum was paid, and your committee therefore recommend the passage of the accompanying bill.

The material facts in the claim of Henry W. Smith, surviving partner of T. & J. W. Gaff & Co., are that during the period from July 1 to December 31, 1864, they deposited in a bonded warehouse in the Fourth district of Indiana, which was under the control of the collector and the storekeeper, 4,254 barrels of distilled spirits, containing, when deposited, 208,748½ gallons; that when said barrels were withdrawn they only contained 199,373½ gallons, as shown by the evidence, making the actual loss 9,375 proof gallons; that the collector required them to pay the tax of $1.50 per gallon on the quantity deposited in bonded warehouse, making the tax paid on the quantity lost by leakage while in the bonded warehouse $14,062.50. In the year 1866 these claimants employed the attorney who was prosecuting the Pate and Thayer claims before the Departments to prosecute their claims, and, while waiting for a decision in the Pate claim, the time expired in which to file the same without fault of these claimants.

The affidavit of Henry W. Smith sets forth the facts as before stated, and avers that the assessment and payment of the tax is illegal and erroneous, and assessed upon a quanity that did not exist when collected, and that the tax was assessed after the loss occurred.

The certificates of the officers of internal revenue are affixed thereto.

The deputy collector of said district certifies as follows:

DEPUTY COLLECTOR'S CERTIFICATE.

I, George Pfalzgraf, deputy collector, Second division, Sixth district, do hereby certify that I have personally investigated the statements made in the within affidavit by comparing the quantity claimed for leakage with the quantity actually allowed for leakage during subsequent years, and from the best information I can obtain after careful inquiry I believe such statements to be in all respects just and true.

GEO. PFALZGRAF,
Deputy Collector, Second Division, Sixth District, Indiana.

LAWRENCEBURG, *August 25, A. D. 1885.*

The clerk in charge of division of accounts in the office of Commissioner of Internal Revenue certifies as follows:

"I hereby certify that the records of this office show that receipts on form 61 were given by late Collector J. L. Yater, covering the amounts mentioned on the first page of Collector Hunter's certificate, and that his reports on forms 86 and 87 show that the same was collected.

"Division of Accounts, September 30, 1885.

"B. H. COLLINS,
"*In charge of Division of Accounts.*"

The collector of the district at the time said tax was paid certifies as follows:

COLLECTOR'S CERTIFCATE.

I hereby certify that I have carefully investigated the matters set forth in the within affidavit, and am satisfied that the statements are in all respects just and true; and I further certify, upon personal examination, that I find the sum for July $57,415.50, August $55,524, and September $79,206, reported against the said T. and J. W. Gaff & Co., on page 1, line 1, of the list on form 60 for July, August, and September, 1864, and also the sum for October $72,331.50, November $48,291.75, and December $115,109.25, reported against T. and J. W. Gaff & Co., on page 1, line 1, of the lists on form 60 for October, November, and December, 1864, now on file in my office, and that the same was paid to me on August 31, September 16, 1864, and on the 2d, 15th, 22d, and 31st days of December, 1864, and are included in my aggregate receipts for said lists, amounting to $643,209, and transmitted to the Commissioner of Internal Revenue, and that no claim for the assessments herein complained of has heretofore been presented; the money herein claimed was not paid on a compromise, and that I was the collector of internal revenue in 1864, during the time said spirits were deposited and withdrawn from bonded warehouse.

October 12, 1885.

JAMES L. YATER,
Late Collector, Fourth District, Indiana.

The assistant assessor at the time said spirits were in bonded warehouse certifies as follows:

ASSISTANT ASSESSOR'S CERTIFICATE.

I hereby certify that I was assistant assessor at the time said spirits were bonded and withdrawn from bonded warehouse in 1864; that I was well acquainted with the members of the firm of T. and J. W. Gaff & Co. in 1864, and from their high standing and the careful investigation of the facts set forth in the within affidavit I believe the statements to be in all respects just and true.

August 25, 1885.

P. LOUIS MATHEWS,
Late Assistant Assessor, ——— Division, Fourth District, Indiana.

The present collector of internal revenue certifies as follows:

UNITED STATES INTERNAL REVENUE,
COLLECTOR'S OFFICE, SIXTH DISTRICT, INDIANA,
Lawrenceburg, August 25, 1885.

I hereby certify, from present personal examination and the personal knowledge of said firm, I believe the statements to be in all respects just and true, and that I find the sum of $427,878.50 reported against T. and J. W. Gaff & Co., on page 1, line 1, of the lists on form 60, for the following months, to wit: July, $57,415.50; August, $55,524; September, $79,206; October, $72,331.50; November, $48,291.75; December, $115,109.25, and are included in the aggregate receipts for said lists, the receipts amounting, in July, to $114,537; in August, $106,431; in September, $126,576; in October, $108,277.50; in November, $66,978; in December, $120,409.50; which were transmitted to the Commissioner of Internal Revenue, and that I do not find that any claim for the assessment complained of has heretofore been presented, nor do I find anything going to show that the money herein claimed was paid on a compromise.

August 25, 1885.

WM. D. H. HUNTER,
Collector, Sixth District of Indiana.

And said collector, under date of September 11, 1885, certifies that the same was paid, as appears from daily record of internal-revenue collections for the Fourth district of Indiana, as follows: August 31, 1864, $11,726.25; September 16, 1864, $3,704.25; December 2, 1864, $9,470.25; December 15, 1864, $48,890.25; December 22, 1864, $76,391.25; December 31, 1864, $273,540.75. There is also a certified copy of the bonded warehouse books, showing the quantity deposited and the quantity withdrawn, which, like other evidence produced, corroborates the evidence already referred to. We therefore recommend a bill to pay said claim.

Hon. John Sherman, while Secretary of the Treasury, in a letter to Hon. Green B. Raum, Commissioner of Internal Revenue, dated November 14, 1877, in speaking of distilled spirits stored in a United States bonded warehouse, says, "there can be no doubt that the assessments for leakage were erroneous and improper."

The Court of Claims found as a fact that the practice had been uniform to only assess the tax upon the quantity withdrawn from bonded warehouse prior to 1869. (18 Court of Claims, 709, Finding 3.) It is admitted that the Court of Claims had no jurisdiction of tax cases (7 Wall., 122; 9 Court of Claims, 367), and that the circuit court of the United States had none (9 Wallace, 560). It is also admitted by the Commissioner of Internal Revenue that it was the general practice to allow similar claims for the loss by leakage while in bonded warehouse under the act of 1864, and that the instructions and regulations of the Commissioner, approved by the Secretary, provided for such allowances, and that the collectors' bonded accounts were settled by crediting the loss for leakage while in bonded warehouse. In a letter of Commissioner Raum, dated May 18, 1882, proposing to allow one of these claims, all being taxed by the same law, he says:

"The allowance for loss by leakage while in warehouse was allowed, and collectors instructed to allow under the act of 1864, but that in some few cases the collectors misunderstood the law and collected the tax on the spirits that had been lost by leakage while in the warehouse."

And from his letter it would appear that there are only four refunding cases that have not been allowed under the act of 1864. Commissioner Walter Evans, in his letter of March 17, 1884, says:

"That it was the general practice to allow the loss of spirits by leakage while in warehouse under the act of 1864, and this accounts for so few cases for refunding being presented."

The Hon. Salmon P. Chase, Hon. Hugh McCulloch, and Hon. William P. Fessenden, while they were Secretaries of the Treasury, as also the Hon. Joseph J. Lewis, Hon. E. A. Rollins, and Hon. Green B. Raum, while they were Commissioners of Internal Revenue, each, by letters, opinions, regulations, and circulars, held that the tax was only to be collected from the quantity withdrawn from warehouse, or sold or removed for sale, etc., and their interpretation of the law was sustained by the Supreme Court of the United States in 97 United States, 268, October term, 1877, where the court decides that no tax can be collected under the act of 1864, section 94, unless *sold* or removed for *sale*, and this section 94 is the same as section 55 of the act of 1864, which levied the tax upon these claimants' spirits, and the Committee on Ways and Means of the Forty-sixth Congress, second session, Report No. 1119, page 15, made by Hon. John G. Carlisle, M. C., says "that the act of 1864 only taxed the quantity sold or removed for sale, and only taxed the quantity sold."

And the same construction was again given to the same law by the same committee of the Forty-seventh Congress, first session, Report No. 1277, page 14, made by Hon. William D. Kelley (chairman), and the Attorney-General of the United States, in 16 Opinions of Attorneys-General, 667, decides that under the act of 1864 the tax can only be collected on what was sold or removed for sale, etc., and was only collectible when it was removed into private hands. Therefore, as it is shown that the law allows, as also the regulations of the Department, and that the invariable construction of the act of 1864 was that it only taxed what was sold, etc., or the quantity withdrawn from bonded warehouse, and, in accordance with the construction given, all loss by leakage while in bonded warehouse was allowed. The bonded accounts of the collectors of internal revenue were settled by allowing them credit for the loss by leakage while in bonded warehouse, and several claims for such loss have been allowed and paid by the Treasury Department, and a large number of such claims have been abated, and it appears from the letters of the Commissioner of Internal Revenue that only three remain unsettled besides the Thayer case. Therefore it would be but just and right to allow these remaining claims, and your committee are of the opinion that there was an erroneous assessment and collection of these taxes, and that they ought to be refunded.

We therefore recommend the passage of the accompanying bill.

The foregoing report sets out the facts correctly and states the law truly, and there is no hesitation in declaring that claimants are entitled to a refund of whatever tax they have paid on any amount over and above the number of gallons actually withdrawn.

Your committee therefore report back bill S. 394 without amendment, and recommend its passage.

You committee readopt the foregoing report and report the bill (S. 352) back without amendment, and recommend its passage.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 355.

IN THE SENATE OF THE UNITED STATES.

APRIL 25, 1894.—Ordered to be printed.

Mr. SHOUP, from the Committee on Pensions, submitted the following

REPORT:

[To accompany S. 1490.]

The Committee on Pensions, to whom was referred the bill (S. 1490) to pension Mollie Crandall, have had the same under consideration, and report:

The claimant is the widow of Clark P. Crandall, who was a captain in the First Oregon Infantry Volunteers. The soldier was mustered into the service December 27, 1864, to serve three years, and was mustered out of service with his company as captain October 31, 1865.

At the time of the soldier's death he was drawing a pension of $12 per month, under the act of June 27, 1890, on account of rheumatism and disease of the heart, and naso-pharyngeal catarrh. He never applied for pension under the general laws, although he would have been entitled to a large pension, as his hearing was very much affected by his army service, and his general health was very poor continually after his discharge. Senator J. H. Mitchell, of Oregon, made an oral statement to the committee that he has known the soldier continuously from a few years before his enlistment until his death, and that he knows of personal knowledge that the soldier was a hale and hearty man before his army service, and that his health was very bad after his discharge until his death.

The widow now draws a pension of $8 per month under the act of June 27, 1890. The application for increase by special act is based on the fact that under the general law she would be entitled to $20 per month, the soldier having served as a captain.

The soldier died August 29, 1893, at Atlantic City, N. J., where he had been taken with the hope that he would find relief, and the following letters from well-known physicians of that city and of this city are submitted to show that soldier's death was due to the disease for which he received a pension, and which was doubtless due to service:

ATLANTIC CITY, N. J., *March 11, 1894.*

Mrs. M. CRANDALL,
Washington, D. C.:

In reply to your request as to the mode and cause of Capt. Crandall's death, I would say that the captain was suffering from "carcinoma of the stomach," of a variety that usually destroys life in about three years. The immediate cause of the patient's death, however, was directly traceable to a weak and more or less damaged heart, that could not be made to perform its proper work in spite of the liberal and continued use of such drugs as digitalis, strophanthu, nitroglycerine, and other

strong heart tonics. Owing to the condition of the heart Capt. Crandall's death occurred at least two years earlier than would have been the case had that organ been in good condition.

Very truly, yours,

B. C. PENNINGTON, M. D.

WASHINGTON, D. C., *March 5, 1894.*

I certify that I attended Capt. C. P. Crandall, of Company C, First Regiment Oregon Volunteer Infantry, as his family physician, a number of times during the past few years, and always for the same chronic trouble, viz, rheumatism of the heart and bowel trouble.

JOS. TABOR JOHNSON, M. D.

WASHINGTON, D. C., *March 7, 1894.*

This is to certify that I attended Capt. C. P. Crandall, of Company C, First Regiment Oregon Volunteer Infantry, from time to time during the past ten years, and particularly in June, 1893, for cardiac disease resulting from rheumatism.

SAM'L J. BOND, M. D.

WASHINGTON, D. C., *March 8, 1894.*

DEAR SIR: A few days ago Mrs. C. P. Crandall mentioned to me that she was trying for a pension. I would, therefore, state that I was intimate with the captain for ten years or more, seeing him almost daily, and had several talks with him regarding his deafness, and I often advised him to make his application for pension on his disability, but always without avail. He often told me how it resulted, and that he had been examined by specialists, and had received treatment at one time for it.

Now, Senator, if my knowledge of his condition will be of any service to her, and an affidavit of same will be necessary, I will gladly make one.

Very respectfully,

C. V. PETTEYS, M. D.

Hon. GEO. L. SHOUP,
U. S. Senate.

Dr. A. J. Hunton, of this city; John P. Church, and R. S. Lacey, each of whom had known the soldier for many years previous to his death, make written statements, which are submitted as part of this report, in which it is asserted that the soldier had often related to them his experience in the service relating to the incurrence of the injuries alleged, particularly his deafness, caused, as they believe, by cannonading.

The statements above referred to are as follows:

To whom it may concern:

This certifies that I was intimately acquainted with the late Capt. C. P. Crandall for a period of seventeen years immediately preceding his death, which took place at Atlantic City, N. J., in August, 1893; that frequently during the period mentioned I heard him complain of suffering from attacks of rheumatism, and that these attacks were of so serious a character as to incapacitate him for the discharge of his duties in the Department in which he was employed at somewhat frequent intervals; that while I never made an examination of his case as a physician, I am decidedly of the opinion that throughout the entire period above mentioned Capt. Crandall was to some extent suffering from what is known in medical parlance as rheumatic diathesis; that Capt. Crandall, to my certain knowledge, during this period, was to quite an extent deaf, and that I heard him state particularly the time and circumstances under which his hearing was impaired, such impairment being the result of the discharge of cannon while he was in the line of duty in the U. S. Army during the late war for the suppression of the rebellion.

A. J. HUNTON,
Late Captain, Twelfth New Hampshire Volunteers.

I knew Capt. Crandall during the last eleven years of his life. My acquaintance early became and remained intimate to the end. I am confident that the statement of Dr. Hunton is exact. I often heard Capt. Crandall speak of the permanent injury to his health that resulted, in his opinion, from his military service. This is particularly true in regard to his deafness. I served three years in a battery, and Capt. Crandall and I have often compared our experiences in action, and particularly the effect of cannonading on the sense of hearing. Capt. Crandall repeatedly asserted, and I have never doubted, that his hearing was permanently and seriously impaired by such cannonading.

JNO. P. CHURCH,
Late Second Lieutenant, First Michigan Artillery.

I got acquainted with Capt. Crandall about seventeen years ago, and was always since on most intimate terms with him. His deafness was marked, and was a subject of frequent discussion between us. It seriously interfered with his duties as commander of our post during his service as such in 1884. I was the quartermaster, and had, necessarily, most intimate relations with him during that year. Though a lawyer by profession, yet I was educated as a physician, and thereby have been often led to investigate critically physical impairment of friends. I regarded Capt. Crandall's deafness as chronic and of serious nature. He attributed his deafness to his Army service.

R. S. LACEY,
Late Captain Volunteers Quartermaster Burnside Post, G. A. R., Department of Potomac.

Your committee believe that the claimant is entitled to the amount named in the bill, namely, $20 per month, and therefore recommend the passage of the bill.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 356.

IN THE SENATE OF THE UNITED STATES.

APRIL 25, 1894.—Ordered to be printed.

Mr. BLACKBURN, from the Committee on Naval Affairs, submitted the following

REPORT:

[To accompany S. 967.]

The Committee on Naval Affairs, to whom was referred the bill (S. 967), "to remit the penalties on gunboat No. 3, the *Concord*, and gunboat No. 4, the *Bennington*," have carefully examined the subject and report it favorably and recommend its passage.

The Secretary of the Navy, in a letter to the chairman of the Committee on Naval Affairs, under date of September 22, 1893, says: "As the contractors were, however, without fault in the matter, it would seem that they have an equitable claim to relief, which is a fair subject for the consideration of Congress," and, further, "that there is no matter connected with the contract for either of said vessels concerning which there has been any contention on the part of the contractors that has not been fully and finally settled."

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 357.

IN THE SENATE OF THE UNITED STATES.

APRIL 25, 1894.—Ordered to be printed.

Mr. PASCO, from the Committee on Claims, submitted the following

REPORT:

[To accompany S. 814.]

The Committee on Claims, to whom was referred the bill (S. 814) for the relief of Daniel C. Rodman and others, sureties on the bond of Ozias Morgan, having considered the same, respectfully report that a similar bill passed the Senate in the Fifty-first Congress and again in the Fifty-second Congress.

The report of the committee on the bill before the Fifty-first Congress was as follows:

The persons named in the bill were sureties on the bond of one Ozias Morgan, given August 9, 1866, for the faithful performance of his duties as a receiver of public moneys and register of the land office at Tallahassee, Fla.

Morgan acted in this capacity from 1866 to 1870, and upon the settlement of his accounts at the expiration of his term, December 31, 1870, a deficit of $1,942.31 was found.

In 1875 suits were separately instituted against five of the six sureties on Morgan's bond, judgment for the United States was rendered in each case, and execution issued. In one (on a judgment of $2,000.57) a return was made of $69.59, and this amount was accepted by the Government and the case against this particular surety compromised. In the other four cases the marshal reported that the defendants were either dead, hopelessly insolvent, or had absconded.

The sixth surety, Daniel C. Rodman, soon after going on the bond, returned to Connecticut several years before the aforesaid suits were instituted and at a time when the other sureties were solvent and in good commercial standing.

Rodman had previously lived in Connecticut, and had gallantly served during the war in one of the regiments of his native State. He returned to Connecticut to accept the position of pension agent, which he filled with that marked integrity that distinguished his whole life. Out of his savings as pension agent he purchased a small piece of property, and at the time of his death, October 9, 1881, his whole estate inventoried about $6,000.

During the lifetime of Col. Rodman he received no official notification whatever of his responsibility for the debt outstanding against Morgan. However, in 1886, twenty years after the giving of the bond and five years after the death of Rodman, the Government for the first time made a demand upon his estate to pay the deficit. As set forth before, his estate at the time of his death was valued at about $6,000, and now nothing remains on which to realize except the modest little homestead on which the widow lives, worth perhaps $2,000 or $3,000. Her pension of $30 a month, together with her skill in sewing, enables her to support her mother and an invalid sister.

Considering that the other five sureties were sued separately; that they either compromised their claims, became insolvent, absconded, or have died, and of the futility of the Government's attempts to recover; that Rodman was never sued on this bond, although there was ample time to have done so during his life; and that the matter, either as to Rodman or his estate has been in abeyance for twenty years,

it would be manifest injustice for the Government now to proceed against the poor widow of Rodman.

Judge Durham, the present First Comptroller, appreciating the hardships such proceedings would incur upon an innocent party, recommended the dismissal of the demand (a *suit* never has been instituted) upon the payment of whatever costs that had been incurred in the individual case of Rodman. No costs had been incurred, but upon tender of $10 by the district attorney of Connecticut under authority of section 3469 of the Revised Statutes, the acting Solicitor of the Treasury demands that the costs of all the individual suits shall be paid.

On this statement of the case the committee report the bill back favorably with an amendment, and when so amended, recommend that it do pass.

The amendment then recommended has been incorporated in the bill now before the committee.

This report was also adopted in the Fifty-second Congress.

The committee find a clerical error in the present bill in spelling the name of one of the sureties. "Slazer," the last word in line 3, should be "Slager," and the bill should be amended accordingly. When thus amended it is recommended that it do pass.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 359.

IN THE SENATE OF THE UNITED STATES.

APRIL 26, 1894.—Ordered to be printed.

Mr. BATE, from the Committee on Military Affairs, submitted the following

REPORT:

[To accompany S. 747.]

The Committee on Military Affairs, to whom was referred Senate bill 747, having considered the same, report:

This is a case in which the Secretary of War is authorized and directed to pay to Ira Bacon, of Company A, Fifty-second Regiment Indiana Volunteers, an additional bounty of $100, notwithstanding the statute of limitations.

Ira Bacon was enrolled September 16, 1861, at Harrisonville, Ind., as private Company A, Fifty-second Volunteers, to serve three years, and was discharged May 7, 1864, on surgeon's certificate of disability. It will be seen, therefore, that he served less than three years.

The statute (sec. 12, July 28, 1866) under which this bill is drawn is as follows:

> That each and every soldier who enlisted in the Army of the United States after the nineteenth day of April, eighteen hundred and sixty-one, for a period of not less than three years, and, having served the time of his enlistment, has been honorably discharged, and who has received, or who is entitled to receive, from the United States under existing laws a bounty of one hundred dollars and no more, and any such soldier enlisted for not less than three years who has been honorably discharged on account of wounds received in the line of duty and the widow, minor children, or parents, in the order named, of any such soldier who died in the service of the United States, or of disease or wounds contracted while in the service and in the line of duty, shall be paid the additional bounty of one hundred dollars hereby authorized.

A subsequent section, 13, provides that the amount shall be $50 where the service was less than three years. Both sections provide that the bounty shall be payable only on account of wounds received. There is no evidence that he ever received a wound of any character. And the record of the War Department shows him to have been discharged the service "because of phthisis pulmonalis, existing prior to enlistment, according to his own statement."

His claim is barred by statutory limitation (act of July 5, 1876, 19 Stat., p. 74). But the bar of limitation removed, he would not be entitled to the additional bounty, because the same could be had only on account of wounds received.

Your committee, therefore, report adversely to the passage of the bill, and recommend its indefinite postponement.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 360.

IN THE SENATE OF THE UNITED STATES.

APRIL 26, 1894.—Ordered to be printed.

Mr. MITCHELL, of Wisconsin, from the Committee on Military Affairs, submitted the following

ADVERSE REPORT:

[To accompany S. 274.]

The Committee on Military Affairs, to whom was referred the bill (S. 274) making an appropriation for the establishment of a national park near Florence, S. C., have had the same under consideration and report the same back with the recommendation that the bill be indefinitely postponed.

The bill contemplates the purchase by the Government of a tract o land near Florence, S. C., containing about 20 acres, for which the price asked is $20,000. A Confederate military prison or stockade was located upon this land during the war. About a hundred rods distant to the northwest is a national cemetery. The idea is thus conceived of establishing a national park for the enjoyment of visitors to the cemetery.

The reports of inspections made by Army officers show that the locality is of a character which would make it unsuitable for park purposes. It is low and marshy, without water for drinking, and is reputed to be unhealthy.

In the opinion of the committee, the locality possesses no advantages which could be utilized for the purposes of a national park. It has little historic value and under favorable climatic conditions would attract but few, if any, visitors. In short, there is but very little in the proposition which would justify the large amount required to purchase and improve the property and to provide for its future maintenance.

For these reasons the committee feel constrained to recommend that the bill be indefinitely postponed.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 361.

IN THE SENATE OF THE UNITED STATES.

APRIL 26, 1894.—Ordered to be printed.

Mr. STEWART, from the Committee on Indian Affairs, submitted the following

REPORT:

[To accompany S. 1623.]

The Committee on Indian Affairs, to whom was referred the bill (S. 1623) for the relief of William Hurt, having duly considered the same, report as follows:

This bill is to authorize William Hurt to make proof before the Secretary of the Interior of an item of improvement for grubbing and clearing land in the Round Valley Indian Reservation, which the commissioners unintentionally overlooked or omitted in making appraisement of improvements under the first section of the act entitled "An act to provide for the reduction of the Round Valley Indian Reservation in the State of California, and for other purposes." The facts with regard to the claim and its omission from the appraisement are fully set forth in the letters of the Secretary of the Interior and the Commissioner of Indian Affairs, hereto attached and made a part of this report. From the facts appearing from these letters the committee recommend the passage of the bill with an amendment limiting the claim for improvement to an amount not exceeding $25 per acre.

The letters of the Secretary of the Interior and the Commissioner of Indian Affairs are as follows:

DEPARTMENT OF THE INTERIOR,
Washington, March 12, 1894.

SIR: I have the honor to acknowledge the receipt, by your reference, of S. 1623, "A bill for the relief of William Hurt," the owner of certain improvements on the Round Valley Indian Reservation in California.

In response thereto I transmit herewith copy of a communication of 10th instant from the Commissioner of Indian Affairs, to whom the matter was referred.

The Commissioner states in view of the facts presented that he believes Mr. Hurt is entitled to pay for the grubbing done by him, and that reasonable allowance for those improvements should have been made by the commission, and he suggests that the bill be amended by inserting in line 8, section 1, after the word "improvement," the words "not to exceed twenty-five dollars per acre for the quantity of land duly proved to have been so improved."

I concur in the suggestion of the Commissioner and see no objection to the passage of the bill, if so amended.

Very respectfully,

HOKE SMITH,
Secretary.

The CHAIRMAN OF THE COMMITTEE ON INDIAN AFFAIRS,
U. S. Senate.

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, March 10, 1894.

SIR: I am in receipt, by Department reference for report, of a communication from the Senate Committee on Indian Affairs, transmitting with request for the opinion of the Department thereon, Senate bill No. 1623, Fifty-third Congress, second session, entitled "A bill for the relief of William Hurt." The bill recites in the preamble that the commission appointed under the provisions of section 1 of the act of Congress approved October 1, 1890, entitled "An act to provide for the reduction of the Round Valley Indian Reservation in the State of California, and for other purposes" (26 Stats., 658) omitted to appraise all of the improvements made by William Hurt upon his land purchased from the State of California, viz, the value of grubbing and putting the land in a state of cultivation at $25 per acre, as appears from the appraisal by said commission of grubbing and clearing other land in the same condition.

The bill therefore recites:

"That the Secretary of the Interior be, and he is hereby, authorized and directed to permit said William Hurt to make due proof of the value of said improvements which were not appraised by said commission, and cause payment to be made to said William Hurt, his heirs or assigns, of the amount found to be justly due for said improvement out of the appropriation made for the purchase of said lands and improvements, as required by the second section of said act, and said payment shall be reimbursed to the United States out of the proceeds of the sale of said reservation lands, under the provisions of section 4 of said act."

The report of said Round Valley Commission, dated March 10, 1891, approved by the Department July 8, 1891, shows that a notice was served upon all persons who were known to have any improvements on land purchased from the State of California within townships 23 north, ranges 12 and 13 west, Mount Diablo Meridian, included in said reservation, to furnish to the commission a full list and description of their several improvements and the value thereof.

In response to said notice the commission received detailed statements from William Hurt and others, which detailed statements were submitted by the commission in a package of original papers marked Exhibit A. The said Exhibit A contains a statement in detail by the said William Hurt, showing the amount of his claim for 50 acres and improvements. The amount so claimed by him was $8,960 and included the item "grubbing, clearing, and seeding alfalfa, $4,000." The commission, in its appraisal of the lands and improvements of the several owners, as shown by Schedule B of its report, allowed Mr. Hurt the sum of $5,161.80 for 50 acres of land and improvements, and included the item "24 acres alfalfa, $144," but made no allowance for grubbing.

By communication dated August 18, 1891, U. S. Indian Agent Willsey, Round Valley Agency, submitted a statement dated August 12, 1891, from said William Hurt, claiming that the commission overlooked the item of grubbing and clearing in the appraisement of his property and that it took more work to clear his land than it did that of his neighbors who were allowed $25 per acre for clearing. In support of his statement Mr. Hurt submitted the affidavits of L. B. Hurt, William Rhoads, and John Stemmons, who swore that, they performed part of the work of grubbing and clearing said land and that said work was worth from $65 to $100 per acre.

By letter of August 31, 1891, Agent Willsey was informed that the commissioners appeared to have carefully investigated all the claims of owners of improvements in said reservation and to have come to a unanimous conclusion as to their value; that their report had been approved by the Secretary of the Interior, whose action in the matter was final, and that the case could not then be reopened, and Mr. Hurt should be so advised.

Under date of April 9, 1892, the Department approved the deed given by Mr. Hurt for the property in question and authorized the payment of the purchase money, $5,161.80, which was subsequently done.

On February 28 last Mr. Luther R. Smith, attorney at law, this city, filed in this office the affidavits of two members of the said commission (the third being dead), and asked that the same may be considered in connection with the claim of William Hurt, for whose relief H. R. bill No. 5683 was introduced by Hon. T. J. Geary. The said affiants are Mr. Luther R. Smith and Mr. Henry C. Hunt, who declare substantially that they were members of the commission duly appointed under the act of Congress approved October, 1, 1890 (26 Stats., 658), to appraise the agricultural lands purchased by individuals from the State of California, and the improvements thereon, within the limits of the Round Valley Indian Reservation; that William Hurt was one of said purchasers of a part of the northwest quarter of section 30, township 23, range 12, containing about 50 acres; that in his written statement to the commission he claimed for "grubbing, clearing, and seeding alfalfa, $4,000;'

that said commission allowed said Hurt only $144 for seeding 24 acres of alfalfa, but omitted to allow him anything for grubbing; that this omission was owing to the fact, as affiants believe, that when the commission viewed said improvements Mr. Hurt failed to mention at that time the claim for grubbing; that the affiants did not intend to disallow the claim of said Hurt for grubbing, but would have allowed him $25 per acre therefor, which was the amount allowed by the commission for similar work on lands adjoining Mr. Hurt's which were in the same condition.

Section 4 of said act of October 1, 1890, provides:

"That the funds arising from the sale of said reservation lands, after paying the expenses of survey, appraisement, and sale, and reimbursing the United States for payment of lands and improvements, as provided in section two of this act, shall be placed in the Treasury of the United States to the credit of said Indians, and the same shall draw such rate of interest as is now or may be hereafter provided by law, which income shall be annually expended for the benefit of said Indians, under the direction of the Secretary of the Interior: *Provided*, That an amount not exceeding one-tenth of the principal sum may be also expended for their benefit during any fiscal year, if deemed necessary by the Secretary of the Interior."

Upon review of the facts before me I believe that Mr. Hurt is entitled to pay for the grubbing done by him, and that reasonable allowance for those improvements should have been made by the commission. Two members of said commission now declare under oath that the omission of the item was apparently an oversight and that it was not their intention to disallow it. There is no way at present by which Mr. Hurt can be compensated except by special act of Congress. The bill under consideration will serve that purpose, but I am inclined to the opinion that it is too liberal in its terms, in that it permits him "to make due proof of the value of said improvements which were not appraised by the commission" and directs the Department to pay to him "the amount found to be justly due for said improvements."

It will be observed that Mr. Hurt in his detailed statement above mentioned claims for "grubbing, clearing, and seeding alfalfa, $4,000." In his claim subsequently transmitted by Agent Willsey as aforesaid, he submits affidavits of three men to the effect that the work was worth from $65 to $100 per acre. The two commissioners in their affidavits state that they would have allowed him $25 per acre for the grubbing, which was the amount allowed on adjoining lands. The lands in question were appraised and bought at the uniform price of $50 per acre. While it is true that the preamble of the bill makes reference to the sum of $25 as being the cost of grubbing and clearing these lands, such reference is not thought to be sufficient to limit or control the express provisions of the bill.

I have therefore the honor to suggest, in returning the bill, the advisability of amending it as follows: In line 8, section 1, after the word "improvement," insert the words "not to exceed twenty-five dollars per acre for the quantity of land duly proved to have been so improved."

Very respectfully, your obedient servant,

D. M. BROWNING.
Commissioner.

The SECRETARY OF THE INTERIOR.

O

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 362.

IN THE SENATE OF THE UNITED STATES.

APRIL 26, 1894.—Ordered to be printed.

Mr. FRYE, from the Committee on Commerce, submitted the following

REPORT:

[To accompany S. 1964.]

The Committee on Commerce has considered the bill (S. 1681), to promote the efficiency of the Revenue-Cutter Service, and makes the following report:

The necessity of Congressional action for the relief of the Revenue-Cutter Service and the promotion of its efficiency, by making provision for the officers of the corps who have become incapacitated to efficiently perform the duties of their offices by reason of advanced age or because of physical disability contracted in the line of duty, can best be shown by an examination of the condition of the personnel of the service as it exists to-day a—condition which has been reached after a great many years because of the absence of any provision of law to correct it. It is a singular fact that for very much more than a quarter of a century there has not been one line of legislation enacted looking to the promotion of the efficiency of the Cutter Service, nor for any other purpose in its behalf, save the annual appropriations for its maintenance, in which have been included the building of an occasional vessel for it at comparatively small cost; and yet such action as is now asked in the pending bill has been urged upon the attention of Congress time and again. The Committee on Commerce of the House of Representatives in the Forty-seventh Congress, first session (Report No. 926, H. R., Forty-seventh Congress, first session), said:

More than 25 per cent of the captains borne upon the register of the Revenue Marine are, through disability resulting from age, long-continued service, or other causes connected with the duties of their profession, unfitted for the performance of active duty. Several officers of the subordinate grades are likewise incapacitated. Some of the disabled are now suffering from wounds and injuries received in action with the enemy during the war.

The same report says further, that—

The carrying upon the roll with the active officers of so large a number of permanently disabled bars the way to promotion of the young and physically efficient, who perform the real work of the Service, thereby removing a valuable aid to discipline and an incentive to improvement.

The same report calls attention to the fact that the necessity of making provision for the retirement of the old and otherwise worn-out officers of the Cutter Service has been urged upon Congress by successive

Secretaries of the Treasury in their annual reports of 1872, 1873, 1876, and 1881.

Of the 207 officers borne upon the last official register of the Cutter Service there are 17, the youngest of whom will have reached the age of 62 in 1894. Of this number (17) 1 is 90, 1 is 94, 1 is 77, 2 are 72, 2 are 70, 2 are 69, 2 are 68, 2 are 66, 1 is 65, 1 is 63, and 2 are 62. Thirteen others have become physically unfit for duty from disease contracted in the Service, and some among them are sufferering now from old wounds received in the war. The total number, then, who would be eligible for retirement under the provisions of the pending bill is 30. Without exception these officers entered the service originally in the prime and vigor of young manhood, and they have all served the Government faithfully for more than half a lifetime. Seventeen of the 30 served in the volunteer Navy during the war. Twenty-six of the 30 are kept upon "waiting orders" while the other 4 should be off duty, being two old for active service.

When the complement of officers (220) allowed to the Service under the law (sec. 2749, R. S.) is full, there are no more than enough to meet the demands upon the force. Unlike the kindred branches of the public service, the Army and Navy, all officers of the Cutter Service who are fit for duty, and several who are absolutely unfit, are constantly on active service, nor have those who can perform duty any respite, save in a short leave, granted when the exigencies of the Service will permit, once each year. It should be borne in mind that 30 officers of the Cutter Service are, for the reasons given, unfit for duty, there are generally from 3 to 5 of the active force required for special duty on shore, in connection with the building and repair of vessels, while 11 others are, under section 8 of the act of June 18, 1878, on detached duty with the Life-Saving Service, which leaves but 158 officers for the vessels of the Service on the Atlantic, Pacific and Gulf coast, and the Great Lakes.

It will thus be understood that the efficiency of the Service is seriously impaired, and imperatively demands action by Congress, and the following measure, now pending, is earnestly urged to meet the case.

All the considerations which have led to the establishment of a retired list for the Army and for the Navy apply with equal force to the Revenue-Cutter Service, and for the following among many other reasons:

(1) That the Cutter Service, under the provisions of section 2752, Revised Statutes, is purely a technical service, in that no person not trained in the technical profession of the sea can hold a commission in the corps, and under regulations prescribed in conformity with the law referred to all officers are required to pass rigid professional examination for entrance and promotion.

(2) This Service is a part of the armed force of the country. Its officers devote their lives to carrying out certain requirements of the public welfare. Its officers and men may be called upon at any time to peril their lives, even in the performance of their routine duties. The ordinary cruising grounds of the revenue cutters are near the coast, exposed to the dangers of treacherous currents, fogs, storms, and other perils of the sea. A number of these vessels are detailed annually to cruise upon the coast during the most inclement season of the year, "to afford such aid to distressed navigators as the circumstances and their necessities may require." The performance of this duty involves much hardship and exposure. The results achieved show material assistance to commerce and the saving of hundreds of lives.

(3) The commissions of officers of the Cutter Service are of the same (life) tenure as those of the Army and Navy. There are living and borne upon the rolls of this Service to day officers who have held commissions from forty to sixty-three years. No officer has ever been dropped from the rolls for other than proven cause, such as bad conduct or failure to pass the required standard in professional examinations for status or promotion. The political affiliations of its personnel play no part in the Cutter Service, either for entrance or advancement. Officers enter this Service, as they do in the Army and Navy, in the lowest grades, and work their way, through long years of service, by promotion (after examination) to the highest.

(4) While the Cutter Service is, under existing law, a part of the Civil Establishment, it is to-day, and has always been, since the foundation of the Government, constantly regarded and treated as a part of the military force of the country. Its vessels are armed cruisers, officered by men bearing the commissions (under military titles) of the President, by and with the advice and consent of the Senate, and manned by duly enlisted men; its officers and crews are uniformed in accordance with regulations prescribed by the Department; naval discipline and routine prevail on board of all its ships; the officers and crews are required to be proficient in naval drills and to possess a practical knowledge of the use of arms; all these things are military. The Service is required by law not only to aid in the protection of the revenue, but to enforce nearly every statute affecting the maritime interests of the country. By acts of Congress the Service is required to aid in the suppression of piracy, in the enforcement of the quarantine laws, and in preventing the violation of the neutrality laws, to suppress mutinies on board merchant vessels, and to use the armament of their ships and force on board, when necessary, to bring vessels to for examination.

(5) Under section 1492, Revised Statutes, officers of the cutter service are invested with naval rank, and under the provisions of section 2757, Revised Statutes, the President may, by a simple order, require the service or any part of it to cooperate with the Navy. Such cooperation is not dependent upon a state of war, but may be ordered at any time. Such was the case during the past two years (and has been ordered again for this year, 1894), when several cutters served in the fleet, under the orders of a naval flag officer, in the Bering Sea.

(6) The following brief résumé of the history of the cutter service is offered in further proof of its thorough military character and as having been always treated under the law as a part of the Military Establishment:

The cutter service was organized under the provisions of the act of August 4, 1790, and in the act approved March 22, 1794, providing for a naval armament, its vessels and crews were placed upon the footing in discipline, drills, and armament of regular vessels of war.

There being then no Navy Department in existence, nor for about six years thereafter, the service was, as a matter of convenience simply in the discharge of public business, attached to the Treasury Department, where it has remained ever since, the act of Congress July 1, 1799, authorizing the President to "cause the revenue cutters to be employed to defend the sea coast and to repel hostility to vessels and commerce within their jurisdiction."

In 1798 the President, "with the view of producing concert of action of the naval forces of the United States," placed certain revenue cutters at the disposal of the Secretary of the Navy, and eight of them

cooperated with the Navy in the French and American difficulties (1798–1800), as set forth in the following tabular statement:

Name and rig of cutters.	Tonnage.	No. of guns.	No. of men.	First commander.	No. of captures.
Sloop Gen. Greene	98	10	34	George Rice, captain	1
Brig Eagle *a*	187	14	70	Hugh George Campbell *b*	5
Brig Pickering *a*	187	14	70	Jonathan Chapman *c*	10
Schooner Seammel *a*	98	10	*d* 34	John Adams	*e* 1
Schooner Governor Jay	187	14	70	John W. Leonard	1
Schooner Viligence	98	10	34	John Brown	.....
Schooner South Carolina	98	10	34	James Payne	.....
Schooner Virginia	187	14	70	Francis Bright	.....

a Transferred to the Navy May 20, 1799.
b Promoted to be lieutenant and master commandant, U. S. Navy, August, 1799.
c Commissioned captain in the Navy in October, 1798.
d Repaired at Philadelphia in June, 1799. She subsequently carried 14 guns and 75 men, and was commanded by Lieut. Fomald, U. S. Navy. Of the officers above named, Capts. Campbell and Chapman were subsequently transferred to the Navy and distinguished themselves as officers in that service.
e Assisted in making the capture.

After the quasi French war these vessels were employed in the suppression of piracy in the West Indies.

By act of Congress, March 2, 1799, the President was authorized to direct the Cutter Service to cooperate with the Navy, as well in peace as in war.

In the war of 1812 revenue cutters were employed as dispatch boats and for coast defense. On several occasions they engaged the enemy and fought him with great bravery and skill, notably in the case of the cutter *Surveyor*, which was captured by an overwhelming force from the British frigate *Narcissus*, after a defense so desperately brave as to cause the British captain to return to Captain Travais, of the *Surveyor*, his sword, with a letter bearing admiring testimony to his gallant conduct.

The following summary statement will show the services rendered by the Revenue Marine during the war of 1812:

Captures made, as follows: 10 merchantmen, 3 barges, 3 officers, 860 men, 1 privateer, 6 nine-pounder cannonades and 6 swivels—14 in all.

Eagle informed squadron off New Haven of the approach of a British fleet, pursued a coast trader and her armed captor.

Mercury escaped from British fleet and gave timely notice to interior towns of their approach.

Active formed part of the New London blockading fleet.

The following were captured: *The Madison*, no particulars. *Commodore Barry*, after determined defense. *Surveyor*, after determined defense. *Eagle*, after determined defense. *The Gallatin* was lost by the explosion of her magazine.

From 1815, for a number of years, some of the most active and gallant officers of the Navy sought and obtained commissions in the Cutter Service, and found ample scope for the excellent seamanship and gallantry which distinguished officers of the Navy at that time. Few officers of the Navy have had imposed upon them more responsible, delicate, and important duties than were devolved upon Lieut. Paine, who, in command of a revenue cutter, represented the United States in the waters contiguous to the British Provinces on our northeastern frontier during the fishery troubles that ensued after the treaty of 1818, and none have discharged such with more credit than he.

In the Florida or Seminole war the Revenue-Cutter Service bore a

prominent part and numerous reports from naval and Army officers are on file commendatory of their efficient service.

The following are the cutters cooperating in the prosecution of said war: *Dallas*, *Washington*, *Dexter*, *Jefferson*, *Jackson*, *Madison*, and *Campbell.*

In December, 1832, and January, 1833, five of the best equipped of the cutters in charge of the most efficient officers rendezvoused in Charleston Harbor in connection with the suppression of nullification proceedings by the State of South Carolina.

The *Service* also bore a conspicuous part in the war with Mexico.

The *Woodberry* assisted the army of occupation under Gen. Taylor in the preliminary operations before active hostilities began, and immediately thereafter, viz, May 16 and 18, 1846, the cutters were ordered to scene of active operations.

These were the cutters *Forward*, *Ewing*, *Van Buren*, *Wolcott*, *Morriss*, and steamers *McLane*, *Legare*, and *Spencer.*

Of these the *McLane* and *Forward* were of the fleet which captured Frontera and Tabasco, and the *Morriss* was lost during the progress of the war.

The *Harriet Lane* was with the Paraguayan expedition in 1858–'59, and so efficient did she prove herself that Flag Officer Shubrick accorded to her commanding officer the highest praise for "the zeal and skill with which he used the very efficient vessel under his command."

During the late war all the revenue cutters were armed, manned, and equipped as naval vessels and were maintained upon a naval footing while the war continued. They were regarded as a part of the naval force of the Government, and included in the force deemed necessary for defense at the several ports at which they were stationed.

The *Harriet Lane* was placed in cooperation with the Navy April 5, 1861; accompanied the fleet designed to relieve the garrison of Fort Sumter, which sailed from New York a few days later. She was present and aided materially in the reduction of forts Hatteras and Clark in August, 1861.

The *Forward* reported to Gen. Butler at Annapolis, Md., almost as soon as that officer assumed command of the post in 1861. The *Miami* and *Stevens* were with the naval fleet in Hampton Roads, and took part in the operations leading to the occupation of Norfolk. The latter also accompanied the flotilla under command of Rogers up the James, and participated in the attack on Dowry's Bluff May 15, 1862.

The *Agassiz* aided in repulsing an attack by an overwhelming force on Fort Anderson at Newbern, N. C., March 14, 1863.

The *Nemaha* was in the waters or South Carolina in constant service in connection with the operations of the Army and Navy, much of the time being the headquarters of Gen. Foster. She engaged a battery on the Tulifiny River on two successive days during Gen. Foster's demonstration in favor of Sherman's march to the sea. She also was the first vessel to proceed up the Ogeechee to Fort McAllister, and received on board Gen. Sherman and conveyed him to the fleet below, and led the fleet a few days subsequently in his passage up the river to Savannah.

A number of the cutters were also at different times ordered out in pursuit of Confederate privateers, which made their appearance along the coast.

Several revenue cutters performed valuable service in the Chesapeake Bay, in cooperating with the Potomac flotilla in preventing the transportation of supplies from the North to the South, and Capt. Thomas

M. Dungan, of the cutter *Hercules*, was killed in action near the Virginia shore.

The only duty which several of the larger vessels performed subsequently to June, 1863, was to cruise along the coast in search of hostile craft.

It thus appears that the military character of the Cutter Service has been established by law in its employment in warlike operations in every war in which the country has been engaged.

It would seem then that no further argument should be necessary to prove that the Cutter Service, which requires commissioned officers to command its armed cruisers and seamen to man them, and the whole subject under the laws of Congress to engage in offensive or defensive protection of the national life, is in fact a part of the military arm of the nation and as such by every consideration of justice and fairness entitled to the same treatment of its old and worn-out personnel which has been extended by a generous government to the kindred branches of the public service, namely, the Army and the Navy.

Objections to making provision for a retired list for the Revenue-Cutter Service may be urged upon the ground that it is purely a civil service. It has been shown that the Cutter Service is essentially a military service and been always so regarded and so treated by the specific enactments of Congress. The manifest difference between the Revenue-Cutter Service and the civil service *per se* is shown by the following comparison of self-evident facts relative to the status and duties required of each:

(1) The hours of duty or labor required of the civil employé of the Government are fixed by law, are comparatively few and confined to daylight, usually from 9 a. m. to 4 p. m. He is subjected to no sudden or unusual calls which demand of him an exhibition of manly fortitude or courageous effort and never to risk his life to save others; no life or property is ever in jeopardy for the loss of which he can be held even remotely responsible; he can choose his own home and secure its privacy; he has but the one home to maintain, and being constantly at his fireside can practice such economy of his means as will secure him against privation in his declining years; he experiences no more of the vicissitudes of life than the ordinary man of business, hardly so much, because his income is assured; should sickness or death invade his home he is always within call; he can devote his leisure to such interests and occupations—not interfering with the duties of his office—as taste and inclination may dictate, thus gratifying desires which render life most endurable, while not a few instances can be cited wherein the incumbents of civil offices thus circumstanced have been enabled by the leisure afforded them after office hours to qualify themselves for the practice of law, medicine, and other professions; in short the choice is left to him whether he shall be a drone in the hive, or become a useful citizen, fitted to cope with his fellows in all the avenues of life.

The conditions here set forth are intended to apply wholly to officers of the civil service of grades corresponding to commissioned officers of the Cutter Service.

(2) On the other hand, the officer of the Cutter Service has no settled home or habitation; he is, by force of circumstances, practically a nomad; he has two separate and distinct establishments to maintain, his own temporary resting place on shipboard and the equally transitory lodgings of his wife and family on shore. He is confined to cramped and inconvenient quarters, in which, for the most part, decent privacy is denied him; he inhabits, with a half dozen others, a room

generally about 10 by 18 feet; here he must sleep, perform his ablutions, receive and entertain his friends, and break his daily bread, with the congenial and uncongenial alike. His sleeping berth is often barely large enough to contain his person; his comforts are such as he can catch as his life wears on; his hours of duty embrace the night as well as the day and cover the whole twenty-four. He is burdened with the responsibilities of many lives, as well as the care and safety of the property confided to his skill and courage; he must brave the terrors of Arctic seas and face the rigors of the winters on our northern seaboards; he must expose himself to the malaria of our southern coasts and to the yellow fever in the Mexican gulf. He must cheerfully leap from his berth at night—at midnight—to obey, often half clad, because of the suddenness of the summons, amid storm and tempest, to save life and property. Amid all discomforting and discouraging circumstances, in the faithful execution of his duty, his voice must be heard above the tumult and din, cheerily encouraging his subordinates, and giving to them the example of a leader for their emulation. Stricken ill in the line of duty, he is rewarded for his abnegation of self by having his already slender pay cut down at the very time when he needs it most. And so, absent from wife, children, home, and friends, he fares as best he may.

It is not urged that the wide differences shown here to exist as between the duties of and the responsibilities devolved upon officers of the civil service on the one hand and those relating to the Cutter Service on the other is proof absolute that the latter is not purely a civil service, but the contention is that only a military service has ever in this country or any other been invested by law with the power, responsibilities, and functions for the performance of duties in any way analogous to those which the Cutter Service has, under the behests of law, discharged from the foundation of our Government to date. Again, as has been previously shown, the officers of the Cutter Service are, under existing law, at all times and under all conditions, subject to the orders of the President, required to discharge any duty whatever that the Navy can be called upon to perform in peace or in the defensive or offensive operations incident to a state of war; whether for home defense or for the invasion of the enemy's country; whether for special or general service in foreign or domestic waters, the Cutter Service is now, and has always been, held under the law to be a part of the military force of the country. Will anybody assert that any part of the civil establishment can be so held? That any law is extant by virtue of which postmasters, railway mail employés, collectors, surveyors, inspectors of customs, chiefs of bureaus and divisions, and clerks in the Departments at Washington, or any of the thousands of other officials and employés who go to make up what is known as the "civil establishment" can be so held? That any law is in existence under or by virtue of which any body of civil functionaries of the Government could be *ordered* into active service for any purpose in time of war *unless* they were first regularly organized, enrolled, and mustered into the service and assigned to the Army or Navy for duty? The exact status of the Revenue-Cutter Service, under existing law, is that of the Army and of the Navy, in that it is a regularly organized, armed, and equipped military corps of 220 officers, 850 seamen, and 36 vessels of all classes, always, and without the least possible friction of law, ready to receive and obey the orders of the Government, be the same what they may.

The effect of the pending measure upon the personnel of the Cutter Service would be to place upon the waiting-order list 17 officers because of the infirmities of age, as set forth in the following table:

List of officers Revenue-Cutter Service, showing their rank, length of service, their ages in 1894, who would go upon "waiting orders" on account of age under section 1.

Number.	Names.	Rank.	Service in U. S. Revenue-Cutter Service.	Service in U. S. Navy.	Total U. S. service.	Ages in 1894.
			Years.	*Years.*	*Years.*	*Years.*
1	Douglass Ottinger	Captain	62	.....	62	90
2	Francis Martin	....do	63	.....	63	94
3	A. B. Davis	....do	33	.....	33	62
4	C. M. Scammon	....do	33	.....	33	69
5	J. A. Henriques	....do	31	.....	31	68
6	David Evans	....do	31	.....	31	77
7	George Walden	First lieutenant ..	39	.....	39	69
8	B. W. Loring	....do	29	5	34	70
9	Robert Barstow	....do	27	6	33	70
10	Samuel Howard	Second lieutenant.	25	8	33	73
11	J. J. Roberts	Chief engineer....	33	.....	33	72
12	Eugene Vallat	....do	30	.....	30	66
13	D. C. Chester	....do	29	3	32	63
14	M. T. Chevers	....do	29	4	33	62
15	A. L. Harrison	....do	30	.....	30	65
16	William C. Wheeler	....do	30	16	46	66
17	M. D. L. Dinsmore	....do	29	2	31	68

RECAPITULATION.

Captains	6
First lieutenants	3
Second lieutenant	1
Chief engineers	7

In view of the fact that a number of officers are now held upon "waiting orders," because of "physical disability contracted in the line of duty," there would be, probably, 13 of these eligible for retirement for the reasons above stated. Their eligibility for retirement would, however, have to be determined in the manner provided in the pending bill, and therefore any statement in advance affecting these officers would necessarily be in the nature of speculation. But all who are at all likely to come within the category of the "permanently physically disqualified" are carefully set forth in the following table:

List of officers of the Revenue-Cutter Service, showing their rank and length of service, who would probably be found permanently physically disqualified for active service.

No.	Names.	Rank.	In Revenue-Cutter Service.	In U. S. Navy.	Total U. S. Service.	Ages in 1894.
			Years.	*Years.*	*Years.*	*Years.*
1	E. L. Deane	Captain	29	2	31	55
2	Eric Gabrielson	.....do	29	4	33	54
3	T. W. Lay	.....do	34	.....	34	56
4	Thomas Mason	First lieutenant	26	7	33	53
5	J. M. Simms	.....do	26	4	30	53
6	T. W. Benham	Second lieutenant	18	6	24	50
7	Robert Henderson	Third lieutenant	29	2	31	55
8	Frank Pulsifer	Chief engineer	35	.....	35	57
9	J. M. McDougall	.....do	30	.....	30	54
10	M. G. Marsilliott	First-assistant engineer	29	1	30	61
11	J. T. Keleher	.....do	21	6	27	51
12	J. F. Fitzpatrick	.....do	20	5	25	51
13	H. C. Henshaw	Second-assistant engineer ..	30	2	32	54

RECAPITULATION.

Captains	3
First lieutenants	2
Second lieutenant	1
Third lieutenant	1
Chief engineers	2
First assistant engineers	3
Second assistant engineer	1

Assuming, then, that there would be 30 officers of all grades to be affected immediately upon the enactment of this bill, the cost of the "waiting-orders" list for the first year is shown as follows:

9 captains, at $1,800 per annum	$16,200
5 first lieutenants, at $1,500 per annum	7,500
2 second lieutenants, at $1,200 per annum	2,400
1 third lieutenant, at $900 per annum	900
9 chief engineers, at $1,500 per annum	13,500
3 first assistant engineers, at $1,200 per annum	3,600
1 second assistant engineer, at $900 per annum	900
	45,000

That is, it would require $45,000 additional to the amount now appropriated annually for the salaries of officers.

Of the officers who would be affected by the operations of the proposed measure immediately upon its enactment many will, in the course of nature, soon pass away, and it is plain therefore that the greatest number that would ever reach the permanent "waiting-orders" list would be that in the first year. After that the cost of maintaining such a list would steadily decrease until within a very few years it would not be more than half the sum required for the first year.

Under existing conditions, those officers who by reason of the infirmities of age and physical disability are upon "waiting orders" still hold their places on the list, and there being no provision of law for filling vacancies thus created, all promotions are blocked; advancement for the active members of the Corps is impossible and the efficiency of the Service is seriously crippled. This condition has prevailed for so many years that when an officer reaches command rank, or to the grade of chief engineer, he is well into the fifties, and in most cases nearer sixty years of age.

There is not one dollar of increase of expense in any other direction asked for in this bill, and all that is asked is that provision be made for the faithful officers of the Corps who have worn their lives out in the service of the Government in the arduous, often hazardous, discharge of their duties. This relief is sought for the benefit of the public service in the promotion of its efficiency; it is sought upon the humane ground that the Government owes it to the men who have given all the years of life worth living to its service in the enforcement of its laws and defense of its integrity.

There are other features of the Revenue-Cutter Service which commend its usefulness and demand the relief asked for.

Under the law of 1837, requiring the President to assign public vessels to service on the coast during the winter months for the relief of storm-driven vessels of commerce, ships of war were at first designated, but could not perform the work, and were soon replaced by the fleet of revenue cutters, and the Cutter Service has performed this hazardous work every year since.

The Revenue-Cutter Service has, under the law cited, relieved hundreds of vessels of the merchant marine of our own and other countries found in distress upon our coasts; it has saved to commerce hundreds of millions of dollars in property, and thousands of lives have been rescued by it from the perils of the sea.

The Life-Saving Service, that great humane establishment, the like of which, as it is to-day, the world never before saw, was born of the Cutter Service, and its efficiency, which is known wherever our language is spoken or read, was made possible by and through the

energetic and arduous labors of officers of the Cutter Service. Its drills were formulated by those officers; its crews were drilled and disciplined, and are to-day by those officers; the technical regulations for its government were formulated by them.

The labors and services of the Revenue Marine, while always arduous both in war and peace, never cease, and the results of its labors in every field of usefulness, whether upon the Atlantic and gulf coast or in the Bering Sea or Arctic zone, or on duty with the Life-Saving establishment, the record is the same—thorough, efficient, and indispensable.

In view of these facts, your committee recommends the enactment into law of the accompanying bill as a substitute for said Senate bill, No. 1681, annexing to their report the letter of the Secretary of the Treasury relating thereto.

TREASURY DEPARTMENT, OFFICE OF THE SECRETARY,
Washington, D. C., March 22, 1894.

SIR: In response to your letter of the 6th instant, transmitting copy of a bill (S. 1681) entitled "A bill to promote the efficiency of the Revenue-Cutter Service," and requesting me to furnish your committee with such suggestions as I may deem proper touching its merits, and the propriety of its passage, I have the honor to say that the necessity for some change in the law, which would enable this Department to avail itself of the services of all the commissioned officers in the Revenue-Cutter Service, has been recognized for several years, and at least 3 of my predecessors in office have made recommendations upon the subject in their annual reports.

In his report for the fiscal year 1872 Secretary Boutwell said:

"The number of commissioned officers is limited by law, and each year adds to those who are disqualified by sickness or unfitted by age for active duty. The hardship resulting from the dismissal of officers under such circumstances is so great that I have declined to exercise a power which may, perhaps, in contemplation of law, be a duty; but in view of the fact that their compensation is small, and the nature of the service such as to bring disease and the infirmities of age upon them prematurely, I think it a plain duty for the Government to provide a retired list so that the active service may be supplied constantly with able and efficient men."

Secretary Richardson repeated this recommendation in his report for 1873, in the following language:

"I desire to renew the recommendation heretofore submitted to Congress that the navy-pension laws be made applicable to the officers and seamen of the Revenue Marine, and that provision be made for a retired list of officers. These measures are demanded to aid in promoting efficiency, and in justice to meritorious officers and seamen whose lives are spent in the performance of hazardous public service."

And again, Secretary Folger, in his report for 1881, said:

"The Service is seriously embarrassed by the large and constantly increasing number of officers who, through old age or physical disability, have become unequal to the performance of duty. The number of officers in the Revenue Marine is limited by law to one of each grade for a vessel, and the active list is reduced by so many as are unfit for duty, there being no provision for retiring the disabled. The active list is still further reduced by details made for duty in connection with the Life-Saving Service, under the act of June 18, 1878. The work of the Service consequently devolves on a smaller number of officers than the law contemplates, or safety and efficient management justify. Besides, the retention of the permanently incapacitated bars the way to promotion of the junior officers, thus removing from the Service a valuable incentive to improvement. To remedy these evils a system for the retirement of officers who have in the line of duty become permanently disabled is desirable."

On the 7th of February, 1881, Secretary Sherman, in response to a letter addressed to him by the Hon. M. W. Ransom, U. S. Senate, after alluding to the recommendations made by his predecessors, stated:

"That the operations of the Revenue-Cutter Service are seriously embarrassed and its efficiency impaired through the want of some provision of the character proposed in the communication referred to. A similar measure was recommended by my predecessors in their several annual reports for the years 1871, 1872, 1873, and 1876. The necessity for the relief contemplated increases with time, and is greater

now than when the recommendations referred to were made. The number of line officers of the Service is limited by the act of July 25, 1861, to one of each grade for each revenue vessel. The exigencies of the Service require several of its officers to be constantly engaged upon special service in superintending the construction and repairs of vessels, inspection duty, and in examining into matters requiring professional experience and skill, while about 7 per cent of the entire corps of officers are totally incapable of performing active duty on account of permanent disability incurred in the Service, and therefore remain unassigned."

A list is hereto attached, showing in detail the official force of the Revenue-Cutter Service, from which it will appear that nearly one-third of the captains are on "waiting orders." The ages of these officers vary from 54 to 94 years, and many of them have been for a long time incapable of rendering any service whatever. There are 36 vessels in the Service.

Section 2749 of the Revised Statutes of the United States provides that the officers for each revenue vessel shall be one captain, one first, one second, and one third lieutenant, and for each steam vessel in addition one engineer and one assistant engineer, but that the Secretary of the Treasury may assign to any vessel a greater number of officers whenever in his opinion the nature of the service which it is directed to perform requires.

The necessities of the Service are constantly increasing, while its effective force is constantly decreasing, and unless some remedy is provided by Congress, the time can not be very far distant when the Secretary of the Treasury will be compelled to seriously consider the propriety of discharging a number of the superannuated and infirm officers in order to fill their places with others who are competent to discharge the duties of the positions which they now hold. Two of the officers now on the "waiting orders" list have been connected with the service more than sixty years, and several of them have served more than thirty years. They were appointed for life, and it would be a great hardship to drop them out of the service after they have become old and infirm without making some provision for them. They are now receiving the same pay from the Government that they would receive if the proposed bill should become a law, and we have, in fact, therefore, a retired list, or "waiting orders" list, but without authority of law to fill the places of the officers who compose it. No such condition exists, or can exist, in any other branch of the public service, and in my opinion the proposed bill, or some measure of a similar character, should be passed by Congress in order to place this very useful part of the customs force upon an efficient basis.

I recommend, however, that the proposed bill be amended by striking out the first and second sections and inserting the following in lieu thereof, to wit:

A BILL to promote the efficiency of the Revenue-Cutter Service.

"That the President of the United States is hereby authorized to convene a board, to be composed of three surgeons of the Marine-Hospital Service, of which the Surgeon-General shall be chairman, to examine and report upon all officers of the Revenue-Cutter Service who have become, or may hereafter become, incapacitated by reason of the infirmities of age or physical or mental disability to efficiently perform the duties of their respective offices, and such officers, as under the terms of this act may be reported by said board to be permanently incapacitated, shall be placed on waiting orders, out of the line of promotion, and the vacancies thereby created in the active list of officers shall be filled by promotion in the order of seniority as now provided by law, and shall be made according to merit and professional qualifications, as determined by written examinations before a board of officers of the Revenue-Cutter Service convened by the Secretary of the Treasury for that purpose: *Provided*, That the number of officers upon the active list now authorized by law shall not be increased by this act."

I have the honor to be, very respectfully,

J. G. CARLISLE,
Secretary.

Hon. MATT RANSOM,
Chairman Committee on Commerce, U. S. Senate.

Number of vessels, officers, and enlisted men in the Revenue-Cutter Service, March 14, 1894.

Grades.	On duty on board vessels.	Special duty Revenue Marine.	Special duty Life-Saving Service.	Waiting orders.	Total.
Captains	21	3	2	10	36
First lieutenants	24	1	6	5	36
Second lieutenants	30	.....	3	3	36
Third lieutenants	21	.....	.....	1	22
Chief engineers	16	3	.....	7	26
First assistant engineers	23	.....	.....	3	26
Second assistant engineers	23	1	.....	1	25
Total	158	8	11	30	207

Number of vessels	37
Number of enlisted men	854
Number of pilots	30
Number of cadets	4

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 363.

IN THE SENATE OF THE UNITED STATES.

APRIL 26, 1894.—Ordered to be printed.

Mr. PASCO, from the Committee on Military Affairs, submitted the following

ADVERSE REPORT:

[To accompany S. 529.]

The Committee on Military Affairs, to whom was referred the bill (S. 529) for the relief of William R. Miller, have carefully examined and considered the record of the case, and submit the following report thereon:

The purpose of the bill is to place William R. Miller's name on the rolls of Company A, Fourth Tennessee Infantry Volunteers, to date from January 21, 1863, and to grant him an honorable discharge as of September 24 of the same year, so that he may be entitled to all the benefits which would have accrued to him if he had been regularly mustered into and discharged from the military service of the United States at the dates specified.

William R. Miller claims that he was enlisted as a private soldier January 21, 1863, by a recruiting officer named James Taylor, of the Fourth Tennessee Regiment, at the upper end of Carter County, in the Crab Orchard; that Taylor was killed a few days after he enlisted Miller; that Miller remained inside the Confederate lines until September 24, 1863, being unable, as he said, to get to his command; that at the last date he was met "by some rebel soldiers" near Carter's Station, and, in attempting to avoid them, he was shot in the leg while climbing a fence; that the wound proved to be a severe one, and his leg was amputated.

In November, 1865, he made application for a pension and there being no record of his enlistment, in March, 1866, he filed an application in the War Department to have his name placed on the rolls. He seems to have satisfied the authorities that his story was true and the Adjutant-General had the enrollment made as of January 21, 1863, and a discharge was ordered on surgeon's certificate of disability to date April 21, 1863, "by reason of wounds received in action January 21, 1863." A pension was afterwards granted August 1, 1867, and he received the benefit of it until November 29, 1873, when his name was dropped "upon evidence showing that he had aided and abetted the late rebellion."

In the early part of 1873 the attention of the Pension Bureau was called to the case as a fraud; it was placed in the hands of a special examiner and a large amount of testimoney was taken. While much of it was contradictory, it seems to have been clearly established that if he had been so disposed he could have got through the Confederate lines after his alleged enlistment as many others did; that instead of doing so, he obtained a detail to work in the niter beds for the Confed-

erate government and one witness states that he was so working only a short time before he was shot.

After this rejection he applied for restoration under the act of March 3, 1877, granting pensions to those who had "aided or abetted the late rebellion," and afterwards voluntarily enlisted and incurred disability in the line of duty. This was referred to the Adjutant-General with the report of the special examiner and the evidence taken, and he revoked his former action, ordering the enrollment and entry of discharge, and the restoration was denied and the claim now stands rejected, on the ground that there is no record evidence of Miller's enlistment in the Army of the United States.

Since then Miller has made further efforts to have his case reopened, but without success, the additional testimony not being deemed sufficient to justify a different conclusion from that reached in 1873. The military history of the claimant from the record and pension division of the War Department closes as follows:

> The name of the alleged recruiting officer, James Taylor, is not found on the rolls, and no evidence of his authority to recruit has been produced.
>
> Under the rulings now governing the Department, as a prerequisite to present recognition as of the military service, there must have been a muster into the service at the time, either actual or constructive, and by constructive muster in is meant, a recognition of service actually rendered. In this case neither of these conditions appear. The man was neither actually nor constructively mustered into the service.

The committee find nothing in the record of the case to justify a reversal of the conclusion reached by the Departmert, and in the absence of satisfactory proof that the claimant was actually enrolled as a soldier in the Army of the United States, recommend that the bill be indefinitely postponed.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 364.

IN THE SENATE OF THE UNITED STATES.

APRIL 26, 1894.—Ordered to be printed.

Mr. WHITE, from the Committee on Commerce, submitted the following

REPORT:

[To accompany S. 1965.]

The Committee on Commerce, having considered the existing legislation for the prevention of collisions at sea, report the accompanying bill and recommend its passage. They append to this report various letters on the subject.

TREASURY DEPARTMENT,
Washington, D. C., April 20, 1894.

SIR: I have the honor to inclose a draft of a bill to repeal article 9 of the act of August 19, 1890, entitled "An act to adopt regulations for preventing collisions at sea" (inclosure A), and respectfully to request its enactment.

The act of August 19, 1890, entitled "An act to adopt regulations for preventing collisions at sea," embodies the recommendations of the International Marine Conference of 1889 at Washington. Section 3 of the act provides:

"SEC. 3. That this act shall take effect at a time to be fixed by the President by proclamation issued for that purpose."

Such proclamation has not been issued, and in consequence the provisions of the act (including article 9, which it is proposed to repeal), are not in force.

The unanimous recommendation of the provisions of the act under consideration by the International Marine Conference of 1889, and the adoption of that recommendation by Congress, as well as the support it has received from those interested in navigation, appear to establish the advisability of giving effect to the act of August 19, 1890.

That act, however, can not go into effective operation without the concurrence of other maritime nations.

With a view to effecting that concurrence the Government of the United States for some time has corresponded with the governments of other maritime nations which participated in the conference. In this correspondence it has been developed that objection to the provisions of article 9 of the act under consideration is so general and pronounced as to indicate little likelihood of international agreement upon those provisions. The article relates to fishing vessels, and the varying requirements of construction and operation of these craft suggest consequent differences in customs which can not, in all probability, be assimilated by uniform international regulation. Thus article 9 of the act is not in operation itself, and, as indicated, is an obstacle, difficult, if not impossible, to surmount in the endeavor to give effect to the remaining recommendations of the International Marine Conference on the subject of collisions at sea.

While various other modifications of the recommendations of the International Marine Conference upon the subject have been suggested by various nations, it appears probable that agreement may be effected upon all essential points except article 9. This opinion is corroborated by the final recommendation of the committee of the British Board of Trade, having the subject under consideration, a copy of which is annexed (Inclosure B).

The United States, as the Government which invited other maritime nations to participate in the conference, having waited for an expression of the views of the nations participating in the conference and having ascertained a specific objection made generally by those nations to one recommendation of the conference, may be expected to remove the ground of objection and thus assist in giving force at an early date to the recommendations which the conference devised to promote the greater security of life and property at sea.

It is understood that the repeal of article 9 of the act of August 19, 1890, will, upon the issue of a proclamation by the President giving force to the remaining articles of the act on and after some future date, leave in force the provisions of article 10, act of March 3, 1885, entitled "An act to adopt the revised international regulations for preventing collisions at sea," which now regulate fishing vessels.

The suggestion that Congress be asked to repeal article 9 of the act of August 19, 1890, in order to facilitate the general adoption by maritime nations of the recommendations of the International Marine Conference, has been submitted to the honorable the Secretary of State, and is approved by him in a communication of the 18th instant addressed to the honorable the Secretary of the Treasury, a copy of which is annexed (Inclosure C). It has also been communicated to the delegates from the United States to the International Marine Conference now in this country, Rear-Admiral S. R. Franklin, U. S. Navy; Capt. W. T. Sampson, U. S. Navy; S. I. Kimball, General Superintendent of the Life-Saving Service; Mr. James W. Norcross, Mr. John W. Shackford, and Mr. William W. Goodrich, and is indorsed by them. The absence abroad of the remaining American delegate, Mr. Clement A. Griscom, has checked the effort to obtain his views. Letters of Mr. Shackford and Mr. Norcross are annexed (Inclosures D and E).

It is respectfully suggested that no change be made in the numbering of the articles after article 9, should Congress see fit to repeal that article, as such change would impair uniformity in the numbering of the articles of the act, which, for obvious reasons, is desirable in international regulations.

Respectfully, yours,

W. E. CURTIS,
Acting Secretary.

Hon. M. W. RANSOM,
Chairman Committee on Commerce, U. S. Senate.

B.

Further report of the committee appointed to consider the alterations in the regulations for preventing collisions at sea, recommended at the Washington International Maritime Conference.

BOARD OF TRADE, S. W., *June 22, 1892.*

The Right Hon. Sir MICHAEL E. HICKS-BEACH, Bart., M. P.,
President of the Board of Trade:

SIR: We have had under consideration the observations of the foreign and colonial governments who have sent replies up to this date, and also of certain shipowners' societies in this country, upon the recommendations made by us in January, 1891, in regard to the proposed international regulations for preventing collisions at sea.

We have also had before us the valuable report of Capt. E. Chichester, R. N., and Mr. H. Noel Malan, together with the views expressed by Germany, Italy, and the Netherlands upon article 9, which deals with the lights and signals of fishing vessels, and we recommend that this subject should be considered independently of the other rules of the road, and dealt with by separate order in council.

We much regret that only two of the five amendments which we suggested in our first report, viz: those in articles 7 and 31 have met with general acceptance, and we are still of opinion that they are all improvements upon the rules adopted at the Washington conference, but having regard to the fact that numerous amendments have been proposed by other powers, parties to the conference, and the indefinite delay which would be caused by an attempt either to press our amendments or to come to a final conclusion upon those proposed by the other powers, we think it best to recommend a course which, so far as this country is concerned, will put an end to the interminable discussion which would otherwise arise and which would still further increase the difficulties in the way of international agreement on the subject. For the same reason we do not recommend the adoption of the suggestion made by the Italian Government for another international conference to consider all such amendments.

We are of opinion that the most satisfactory course will be for Her Majesty's Government to adopt the regulations as passed at Washington, article 9 excepted, with the addition of article 7 and the alteration in article 31, which we recommended in our first report, these two amendments having been assented to by all the powers from whom replies have been received, and with the addition of the note to article 21 recommended hereafter.

In the hope that the regulations in this form may be accepted by all the powers we are willing to withdraw the suggested alterations in articles 2, 15, and 21, but we retain the opinion that the multiplication of sound signals in article 15 may possibly result in confusion, and we recommend, in lieu of the proposed amendments to article 21, the addition of the following note to that article:

"NOTE.—When, in consequence of thick weather or other causes, such vessel finds herself so close that collision can not be avoided by the action of the giving-way vessel alone, she also shall take such action as will best aid to avert collision. (*See* articles 27 and 29.)"*

This note should be part of the regulations as approved by order in council.

In the event of these proposals being approved we recommend that an order in council be prepared as soon as possible, applying, after reasonable notice, these regulations to British vessels everywhere, and to foreign vessels in British waters; and that a letter be addressed to all the powers which were parties to the Washington conference, stating the action taken by this country and expressing a strong hope that they will adopt the same regulations, having regard to the extreme importance of such regulations being international.

In the letter addressed to the U. S. Government it should be stated that we have added the note to article 21, as we consider it very important that mariners should have their attention called to the controlling rules, and the U. S. Government has not expressed any dissent from the principle.

The only other power which has hitherto objected to this amendment to article 21 is Portugal. We recommend that in the letter addressed to that country it should be pointed out that we have added the note for the guidance of mariners, as stated above.

We wish to add that we feel much indebted to our secretary, Mr. Garnham Roper, for the great ability and constant attention he has displayed during the protracted deliberations of the committee.

We have the honor to be, sir, your obedient servants,

CHARLES HALL, *Chairman.*
N. BOWDEN SMITH.
HENRY G. CALCRAFT.
R. H. M. MOLYNEUX.
D. MURRAY.
G. S. NARES.
THOS. SUTHERLAND.
CHAS. G. WEILER.
W. J. L. WHARTON.

GARNHAM ROPER,
Secretary.

[Explanatory note to report of committee of the board of trade.]

The addition to article 7 referred to is as follows:

4. Rowing boats, whether under oars or sail, shall have ready at hand a lantern showing a white light, which shall be temporarily exhibited in sufficient time to prevent collision.

The alteration in article 31 permits the use of "other explosive signal" as well as of a gun, to be fired at intervals of about a minute as a distress signal.

E. T. C.

C.

DEPARTMENT OF STATE,
Washington, April 18, 1894.

SIR: I have the honor to acknowledge the receipt of the letter of the Acting Secretary of the Treasury, of the 14th ultimo, giving the views of your Department concerning the proclaiming by the President of the time when the regulations provided for in the act of August 19, 1890, entitled "An act to adopt regulations for preventing collisions at sea," shall take effect.

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* *i. e.*, of the regulations passed at Washington, they become articles 26 and 28 by the separate treatment proposed for article 9.

The conclusions reached in the letter under acknowledgment meeting with the approval of the delegates from the United States to the late International Marine Conference of 1889, and the advisability of giving effect, as far as possible, to the act of August 19, 1890, being evident, I concur in the suggestion that Congress should be asked to repeal article 9 of the act in question, which article refers exclusively to fishing vessels and boats, on which subject it can not be hoped that any substantial accord can be presently reached by the various maritime nations.

As the subject-matter concerns more especially the Treasury Department, I beg, however, to suggest that you will address to Congress the necessary communication suggesting the advisability of repealing article 9 of the above-mentioned act as a preliminary but necessary step to receiving the acceptance by foreign maritime powers of the rules proposed by the International Marine Conference, and to putting the act thus amended into operation by a proclamation by the President.

I have the honor to be, sir, your obedient servant,

W. Q. GRESHAM.

The SECRETARY OF THE TREASURY.

D.

INTERNATIONAL NAVIGATION COMPANY,
Jersey City, April 6, 1894.

DEAR SIR: Your favor of April 3 at hand and contents noted.

In reply I beg to say that I agree entirely with Rear-Admiral Franklin, Mr. W. W. Goodrich, and Mr. Kimball, "that the best way to put into effect the recommendations of the conference is to ask Congress to repeal article 9, and * * * to proclaim the rest of the act as in force at some future date." I also agree with these gentlemen that "so long as article 9 remains in the act there is no likelihood of an international enactment by other nations of the remaining provisions."

I have seen a copy of Mr. Goodrich's letter to the president and have also been consulted by Mr. James A. Wright, jr., second vice-president of this company, as to the letter of the Maritime Exchange on the same subject, and am therefore somewhat familiar with what is being done in the premises.

I beg to add that I can not too strongly urge that everything possible should be done to make the rules recommended by the late Maritime Conference the rule of the road at sea, as it appears to me that every impartial and practical man must agree that they are a vast improvement on the regulations now in force.

Yours, truly,

J. W. SHACKFORD.

Hon. EUGENE T. CHAMBERLAIN,
Commissioner of Navigation, Treasury Department, Washington, D. C.

E.

PILOT COMMISSIONERS' OFFICE,
CHAMBER OF COMMERCE,
Boston, April 5, 1894.

DEAR SIR: I have the honor to own receipt of your favor 3d instant, requesting my views on the advisability of repealing article 9 of the new rules of the road relating to fishing vessels. After a careful examination of said article and comparing it with the present rules, I see so little difference as regards the methods of fishing mostly practiced by our own vessels, that if the long-hoped-for international comity and international promulgation of the new rules can be thus obtained I think it the most advisable course that could be pursued.

Of course I understand that the present fishing rules will thereby remain in force and be in their proper place in the American edition of the new rules when issued.

This long delay has been the source of much speculation on my part, not having been cognizant of the real cause.

I have been pained to notice several very serious disasters that could not have occurred had the new rules been in force, and if the repeal of article 9 is all that stands in the way, then in my opinion the sooner that article is repealed the better.

Very respectfully, yours,

JAS. W. NORCROSS.

Hon. EUGENE T. CHAMBERLAIN,
U. S. Commissioner of Navigation.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 365.

IN THE SENATE OF THE UNITED STATES.

APRIL 26, 1894.—Ordered to be printed.

Mr. GORMAN, from the Committee on Printing, submitted the following

REPORT:

[To accompany House concurrent resolution to print and bind in cloth 1,500 copies of the Annual Report of the Health Officer of the District of Columbia; 100 for the use of the Senate, 350 for the use of the House of Representatives, and 1,050 for the use of the Health Officer.]

The Committee on Printing, to whom was referred the accompanying resolution, having considered the same, report it back with the following amendments:

In line 4 strike out "fifteen" and insert "twelve."

In line 6, after the word "Columbia," insert "for 1893."

Strike out all from the beginning of line 7 down to the word "for," in line 10.

As amended, the committee recommend the passage of the resolution.

The resolution, as amended, is in conformity with past usage in respect to this document, both as regards the number printed and the method of distribution. The distribution to Congress proposed in the House resolution was of doubtful utility, since it did not afford one copy to each member of the House of Representatives.

The Public Printer estimates the cost of 1,200 copies at $560.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 366.

IN THE SENATE OF THE UNITED STATES.

APRIL 26, 1894.—Ordered to be printed.

Mr. GORMAN, from the Committee on Printing, submitted the following

REPORT:

[To accompany Senate resolution to print 5,000 copies of Senate Report No. 331, relative to the Nicaragua Canal, together with a topical index of said report prepared under the direction of the Committee on Foreign Relations.]

The Committee on Printing, to whom was referred the accompanying resolution, having considered the same, report it back without amendment and recommend that it do pass.

The Public Printer estimates the cost at $496.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 367.

IN THE SENATE OF THE UNITED STATES.

APRIL 26, 1894.—Ordered to be printed.

Mr. SHOUP, from the Committee on Indian Affairs, submitted the following

REPORT:

[To accompany H. R. 2710.]

The Committee on Indian Affairs having had under consideration the bill (H. R. 2710) for the relief of Jesse S. Morrison, adopt and submit as their own the report of the House Committee on Indian Affairs on the same, presenting the statement of facts and conclusions therein, and recommend the passage of the bill, as amended, and as it passed the House.

HOUSE REPORT.

The Committee on Indian Affairs, to whom was referred the bill (H. R. 2710) for the relief of Jesse S. Morrison, beg leave to report that the Commissioner of Indian Affairs having recommended the passage of the bill with amendments, and the committee having duly considered the same, report the bill back favorably and recommend its passage as amended. The report of the honorable Commissioner of Indian Affairs is as follows:

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, October 7, 1893.

SIR: I am in receipt, by your reference for report and return of papers, of a communication dated September 26, 1893, from Hon. Thomas C. McRae, chairman of the Committee on the Public Lands, House of Representatives, inclosing H. R. 2710, with the request that you give the committee your opinion as to the propriety of passing the same.

The bill is entitled "A bill for the relief of Jesse S. Morrison," and provides that a patent in fee simple be issued to the said Jesse S. Morrison, his heirs and assigns, for the northeast quarter of the southwest quarter and lot 7, section 8, township 12 north, range 7 west, Indian meridian; the south half of the southeast quarter of section 29, township 13 north, range 7 west, Indian meridian; the southeast quarter of the southwest quarter and lot 8, section 8, township 12 north, range 7 west, Indian meridian; and the north half of the southeast quarter of section 29, township 13 north, range 7 west, Indian meridian, Oklahoma Territory, said patent to be in lieu of patents issued on March 6, 1862, to Ben nank, or Edward Morrison, and Wo ca sa now ka, or Nellie Morrison, now deceased, the children of said Jesse S. Morrison, allottees under section 13 of the act entitled "An act making appropriations for the current and contingent expenses of the Indian Department and for fulfilling treaty stipulations with various Indian tribes for the year ending June 30, 1892, and for other purposes," approved March 3, 1891.

It is stated for the information of the Department, that by letter dated December 24, 1892, Mr. Jesse S. Morrison stated that he was the father of Edward Morrison and Nellie Morrison, deceased, members of the Arapaho tribe of Indians, to whom cer-

tificates of allotment were issued March 25, 1892, by the special allotting agent for certain lands, and that he had been duly appointed and qualified as the administrator of their estates, as shown by letters of administration which he inclosed with his said letter; that actions are pending in the Territorial court for possession against one E. E. Wilson, who had entered upon and inclosed the whole of the said allotted tracts, and that he therefore requested that the patents for said tracts be sent to him in order that he might use them in evidence, the cases having been set for trial February 7, 1893.

This office, accordingly, by letter dated January 16, 1893, transmitted the patents for the said Edward Morrison and Nellie Morrison to the U. S. Indian agent, Cheyenne and Arapaho Agency, for delivery to Mr. Morrison, and Mr. Morrison was so advised by letter of the same date.

Article 6 of the agreement concluded with the Cheyenne and Arapaho Indians on the —— day of October, 1890, and ratified by the act of Congress approved March 3, 1891 (26 Stats., 1024), provided that—

"When said allotments of land shall have been selected and taken as aforesaid, and approved by the Secretary of the Interior, the titles thereto shall be held in trust for the allottees, respectively, for the period of twenty-five years, in the manner and to the extent provided for in the act of Congress entitled 'An act to provide for the allotment of land in severalty to Indians on the various reservations, and to extend the protection of the laws of the United States and the Territories over the Indians, and for other purposes,' approved February eighth, eighteen hundred and eighty-seven; and at the expiration of said period of twenty-five years the titles thereto shall be conveyed in fee simple to the allottees or their heirs free from all incumbrances."

Under the said provision of law the lands, upon the death of the patentees, descend to their heirs according to the laws of descent in force in the Territory of Oklahoma.

I am now in receipt, by your reference for consideration in connection with the above, of a letter dated October 3, 1893, from Mr. William T. S. Curtis, attorney at law, this city, in which he submits for your consideration, in connection with said bill, the following evidence explanatory of the measure, to wit: (1) Copies of the patents issued to the 2 children of said Jesse S. Morrison. (2) Decree of probate court of Oklahoma declaring Jesse S. Morrison the sole heir. (3) Certificate of the agency physician as to the death of the said children. (4) Affidavit of John B. Miles, ex-Indian agent, as to the facts. (5) Affidavit of the claimant, Jesse S. Morrison. (6) Printed report of the governor of the Territory.

The copies of the patents above referred to show that they were issued with the usual twenty-five-year trust clause. The decree of the probate court of Canadian County, Okla., shows the death of Edward and Nellie Morrison, and declares that the said Jesse S. Morrison is the sole heir of the said children. The certificate of George R. Westfall, agency physician, dated December 1, 1892, shows that he was in attendance upon the said children, and the cause of their death. The affidavit of ex-Indian Agent Miles shows that he was Indian agent for the Cheyenne and Arapaho Indians from May, 1872, to May, 1884; that he was personally acquainted with Jesse S. Morrison, who resided at the agency during that time; that the said Morrison was married to and was living with Emma or Bah ah tha, the daughter of Big Mouth, an Arapaho chief; that they lived together as husband and wife until the death of the wife in 1873; that deponent often visited the home of said Morrison while the wife was living, was well acquainted with her, and knows that the said Jesse S. Morrison treated her kindly and lovingly as a wife and provided well for her; that there was born unto the said Jesse S. Morrison and Emma, his wife, two children, Nellie Morrison and Edward Morrison, whom he well knew until the time of their death in the year 1892; that the said Jesse S. Morrison treated the said Nellie and Edward as his children and provided for their living and education as his children and in every way assumed all obligations for their support; that the said Nellie and Edward Morrison were rightfully and legally carried on the rolls of the said Arapaho tribe of Indians at said agency and were entitled to all the benefits from the Government accruing to said Arapaho tribe of Indians by treaty or otherwise.

In the affidavit of the claimant, Jesse S. Morrison, he states that he is a white man and a citizen of the United States; that he married an Arapaho Indian woman in the year 1867 and lived with her as his wife until her death in 1873; that the issue of said marriage was two children, Nellie and Edward Morrison; that Nellie died February 15, 1892, aged 22 years, and Edward died May 2, 1892, aged 21 years; that said children were unmarried and died without issue; that the estate of said Nellie and Edward Morrison consists of allotments received of land as described in the bill; that under the treaty by which said described allotted lands were allotted the title is inalienable for twenty-five years; that under the statute of Oklahoma Territory (chap. 88, sec. 6893, p. 212), "If decedent left no issue, nor husband, nor wife,

the estate must go to the father;" that the reasons for keeping these lands inalienable no longer exist, as they are now in the hands of a white man, and as he is now 53 years of age it is probable that he will be dead before it becomes alienable, and that it would be a great benefit to him to have the title so changed that he could dispose of parts of the land in order to get money to improve the balance.

The reasons presented in favor of the bill being considered by this office as good and sufficient, I have the honor to return it and the accompanying papers with the statement that this office has no objection to its enactment into law; with the proviso, however, that it be so amended as to direct that the said patent in fee simple be issued to the heirs of the said Edward and Nellie Morrison, generally, without naming them.

Very respectfully, your obedient servant,

D. M. BROWNING,
Commissioner.

The SECRETARY OF THE INTERIOR.

The committee recommends the following amendments to the bill, in line with the suggestions set out in said report, to wit:

In line 3 of said bill strike out the name "Jesse S. Morrison."

In line 4 strike out the word "his" and substitute therefor the word "the," and also, in line 4, strike out the words "and assigns" and substitute therefor "of Edw ard Morrison and Nellie Morrison, late of Oklahoma Territory, now deceased," and in lines 16 and 17 strike out the words "the children of said Jesse S. Morrison."

Your committee also recommend that the title be amended so as to read as follows: "A bill for the relief of the heirs of Edward Morrison and Nellie Morrison, now deceased."

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 369.

IN THE SENATE OF THE UNITED STATES.

APRIL 30, 1894.—Ordered to be printed.

Mr. MANDERSON, from the Committee on Military Affairs, submitted the following

REPORT:

[To accompany S. 473.]

The Committee on Military Affairs, to whom was referred the bill (S. 473) entitled "A bill to remove the charge of desertion from the military record of Jeremiah L. Daly," have had the same under consideration, with the accompanying papers, and report it back favorably with amendments.

As appears from the records of the War Department, Jeremiah L. Daly was enrolled September 27, 1861, for a period of three years, as a private of Company E, Ninth Connecticut Volunteers. He served with his command until May 28, 1863, when he absented himself without leave, and the next day, May 29, enlisted as a private in the Twenty-sixth New York Independent Battery, which was encamped near his former command. Shortly after his second enlistment he was arrested, tried by court-martial, convicted, and sentenced to eighteen months at hard labor with ball and chain on Ship Island. He served out his sentence at the Dry Tortugas, and was discharged on an individual muster-out roll at Fort Columbus, New York Harbor, May 2, 1865.

There are on file with the bill a number of affidavits of comrades of Daly which show the circumstances attending his desertion to be as follows: In May, 1863, while the Ninth Connecticut Infantry was encamped at Lafayette Park, New Orleans an order was issued inviting volunteers to enlist in a United States battery, stationed in the vicinity. On account of unpleasant relations existing between Daly and a lieutenant of his company he desired to be transferred to the battery, but this permission was refused him, although three of his comrades were transferred. Angered at what he considered unjust discrimination, and not appreciating the seriousness of leaving one command without proper discharge to enlist in another, he, in company with a comrade, deserted, and the next day, under the name of "James Lines" enlisted in the Twenty-sixth Independent Battery. He appears to have made no attempt at concealment, other than the use of an alias, and was shortly afterward recognized and arrested. The record of the court-martial discloses the fact that Daly received no bounty for his second enlistment.

This case seems to come within the intent of the act of March 2, 1889, for if Daly had escaped arrest and served out his enlistment in the

New York Battery he would have been entitled to have the charge of desertion removed from his military record and an honorable discharge granted to him by the terms of the act of March 2, 1889, which provides:

SEC. 3. That the charge of desertion now standing on the rolls and records in the office of the Adjutant-General of the Army against any regular or volunteer soldier who served in the late war of the rebellion by reason of his having enlisted in any regiment, troop, or company, or in the United States Navy or Marine Corps, without having first received a discharge from the regiment, troop, or company in which he had previously served, shall be removed in all cases wherein it shall be made to appear to the satisfaction of the Secretary of War, from such rolls and records, or from other satisfactory testimony, that such reenlistment was not made for the purpose of securing bounty or other gratuity that he would not have been entitled to had he remained under his original term of enlistment; that the absence from the service did not exceed four months, and that such soldier served faithfully under his reenlistment.

Inasmuch as Daly did not desert to avoid military service, nor to obtain additional bounty, and inasmuch as he paid the full penalty of his desertion, your committee is of the opinion that he should be granted an honorable discharge from the United States service, to date from the promulgation of the sentence of the court-martial, November 5, 1863.

Daly having fully served his sentence the charge of desertion no longer stands against his military record, and your committee therefore propose to amend the title of the bill to make it read "A bill to grant an honorable discharge to Jeremiah L. Daly;" and beginning in line 6 of the bill strike out the words "removing the charge of desertion standing against his name," and by adding at the end of line 8 the words "notwithstanding the sentence of the court-martial promulgated November 5, 1863; said discharge to bear the date of November 5, 1863."

Bill as proposed to be amended.

A BILL to grant an honorable discharge to Jeremiah L. Daly.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War be, and he hereby is, authorized and directed to correct the military record of Jeremiah L. Daly, late private of Company E, Ninth Connecticut Regiment United States Volunteers, by granting him an honorable discharge from his said service, notwithstanding the sentence of the court-martial promulgated November fifth, eighteen hundred and sixty-three, said discharge to bear the date of November fifth, eighteen hundred and sixty-three.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 371.

IN THE SENATE OF THE UNITED STATES.

MAY 2, 1894.—Ordered to be printed.

Mr. MCPHERSON (for Mr. GIBSON), from the Committee on Naval Affairs, submitted the following

REPORT:

[To accompany S. 1769.]

The Committee on Naval Affairs, to whom was referred Senate bill 1769, having carefully considered the same, recommend its passage with an amendment.

On page 2, section 3, line 2, strike out the word "continuous" and insert the word "contiguous," to correct a typographical error.

The committee have had the Superintendent of the Naval Observatory before them with the maps and tracings showing fully what is desired for the security of the Observatory, and are satisfied, after a careful examination of all of the papers submitted and a full consideration of the questions involved, that the bill covers all the requirements for the protection of the Observatory and to provide for the proposed extension of Massachusetts avenue.

The following correspondence of the Superintendent of the Observatory fully explains the provisions of the bill:

U. S. NAVAL OBSERVATORY, GEORGETOWN HEIGHTS,
Washington, D. C., February 27, 1894.

SIR: Referring to the order of the honorable Secretary of the Navy, dated February 15, 1894, directing the Superintendent of the Naval Observatory to go before the Committee on Naval Affairs, U. S. Senate, with maps relating to the extension of Massachusetts avenue through the grounds of the U. S. Naval Observatory, and the fulfillment of these orders on the 21st instant, together with the directions of the committee in the premises, I have the honor to submit the following, viz:

Referring to the Senate Ex. Doc. No. 9, Fifty-third Congress, second session, draft of an act to establish an observatory circle, etc., p. 4, third paragraph, third line, after the word "proviso" add "and that Massachusetts avenue as laid down in conformity with that proviso upon the maps of the engineer department of the District of Columbia through the grounds of the United States Naval Observatory be, and the same hereby is, declared to be a public street in all respects as the other public streets of the District of Columbia," so that the said paragraph shall read: "That the Secretary of the Navy be, and is hereby, authorized to grant the right of way for the extension of Massachusetts avenue through the limits of the said observatory grounds exterior to said circle in accordance with the foregoing proviso, and that Massachusetts avenue as laid down in conformity with that proviso upon the maps of the engineer department of the District of Columbia through the grounds of the United States Naval Observatory be, and the same hereby is, declared to be a public street in all respects as the other public streets of the District of Columbia."

By the foregoing amendment to the draft of "An act to establish an observatory circle as a provision for guarding the delicate astronomical instruments," etc., the District of Columbia obtains all that was contemplated in the joint resolution

(S. R. 28, Fifty-third Congress, first session), as it passed the House of Representatives; the Naval Observatory receives all necessary protection without further special laws for each street; and the recommendation made by the honorable Secretary of the Navy in his letter of December 15, 1893, to the Hon. Isham G. Harris, is given effect.

Referring again to Senate Ex. Doc. No. 9, Fifty-third Congress, second session, p. 4; in paragraph 4, line 2 of the draft of "An act to establish an observatory circle as a provision for guarding the delicate astronomical instruments," etc., a clerical error occurs in the use of the word "continuous" for "contiguous." This was pointed out, and its correction requested, by the honorable Secretary of the Navy in a letter to Hon. Isham G. Harris, dated January 5, 1894.

There are forwarded herewith 10 copies of the plan of the Naval Observatory site, showing Massachusetts avenue extended, and the various plats of ground which are respectfully recommended to be sold and purchased.

Very respectfully,

F. V. McNAIR,
Captain, U. S. Navy, Superintendent of Naval Observatory.

Hon. CHARLES H. GIBSON,
U. S. Senate, Washington, D. C.

U. S. NAVAL OBSERVATORY,
Washington, December 4, 1891.

SIR: I have the honor to submit for the consideration of the Bureau the inclosed draft of "An act to establish an observatory circle as a provision for guarding the delicate instruments at the U. S. Naval Observatory against smoke or currents of heated air in their neighborhood and undue vibrations from traffic upon the extension of public thoroughfares in the vicinity, and for other purposes."

The object to be accomplished by the passage this act is the preservation and maintenance, within practicable limits, of such characteristics of the new Naval Observatory site as are necessary to insure the possibility of making reasonably successful astronomical observations. In explanation of the necessity for such legislation, the Bureau's attention is invited to the documents printed in the report of the Secretary of the Navy for 1881, pp. 737 to 745, No. 15, namely: "An act to locate and purchase a new site for the United States Naval Observatory," approved February 4, 1880; to the report of Senator William Pinkney Whyte, of Maryland; Representative Leopold Morse, of Massachusetts, and Rear-Admiral John Rodgers, U. S. Navy, Superintendent of the Naval Observatory; to results of the examination of certain sites suggested as suitable for the Observatory; to the report of Assistant Astronomer H. M. Paul, dated April 12, 1880, upon the effects of railroad trains in transmitting vibrations through the ground, etc.; to notes on Berlin, Vienna, Greenwich, and Paris observatories; also to the report of a board convened by my order, appended hereto.

In the report to the commission, the distinguished scientists, Profs. F. A. P. Barnard, Columbia College, New York, Henry A. Rowland and Charles S. Hastings, Johns Hopkins University, Baltimore, Md., laid down the following general principles, viz:

"Before proceeding to details, it may be well to state what, in view of the undersigned, should be the characteristics of a spot fixed on to be the site of a working observatory. Such a site should, in the first place, be located where it may command an atmosphere as steadily unobscured and as uniform in density as the general condition of the climate will allow. It should, therefore, be remote from factories or clustered dwellings, which by the smoke of their many fires tend to vitiate the clearness of the air. There should not be in the vicinity any large surfaces of earth unclothed with vegetation and thus exposed to be heated to excess by the direct rays of the summer sun, and so to generate rising currents of unequal density which may distort the figure and disturb the steadiness of the images of celestial objects. For the same reason massive architectural structures in the neighborhood must be regarded as objectionable, even though artificial fires may not be maintained in them; and on this account alone public highways, if their neighborhood were not otherwise prejudicial, should be kept at as great a distance as possible.

"But a still more serious objection to the vicinity of public highways is found in the tremors, occasioned by vehicles rolling over them, in the instruments of the observatory. This is an evil of so grave importance as to form an objection absolutely conclusive against any proposed site liable to be affected by it. Persons without experimental knowledge of the subject can have no just idea of the facility with which tremors, even from causes apparently slight, are transmitted through the earth. No degree of massiveness in a structure will exempt it from liability to

such disturbance, for the reason that the motion is not that of the mass itself, but that of its molecules which are successively displaced. An ordinary milk cart in the streets of New York will cause the chandeliers in a dwelling perceptibly to tremble. This is most strikingly the case in parts of the city where the pavements and dwellings rest equally on an underlying rock of indefinite extent, since the rock by its elasticity transmits tremors more freely than loose sand or soft earth. It is for this reason that in the construction of an observatory the floors of the observing rooms are not allowed to touch the piers on which the instruments rest, lest the movements of the observer himself should disturb his instrument.

"An astronomical observatory ought, therefore, if possible, to be placed at a distance from all great thoroughfares; and though such a location diminishes facility of access to it, yet, considering the purposes for which such establishments are created, there seems to be nothing objectionable in this. National observatories have not been founded by governments simply out of the generous desire to promote the advancement of science. The motive which has prompted their erection has been far less disinterested than this, and is found in the encouragement such institutions afford to commerce by the security with which they surround navigation. It is probable that no appropriations from the public treasury of any commercial nation have ever been repaid so many thousandfold as those which have been made for the improvement of our knowledge of the positions and movements of the heavenly bodies. But the benefits thus gained are only secured by long-continued, patient, and persevering observation on the part of those who sacrifice themselves to this exhausting task. That these observers may accomplish what they aim at and what is expected of them, therefore, it is of the highest importance that they should not be needlessly interrupted in their labors; and hence it must be accounted an advantage, and not an objection, to the location of an observatory that is so far secluded from crowded ways as to be withdrawn from the notice of the curious multitude.

"Before proceeding to the inspection of particular sites the undersigned availed themselves of the opportunity furnished them by Admiral Rodgers to study carefully the map showing the situation of the several properties to be examined with their neighboring topography; and they also read attentively the report made to the commission on the experimental observations in regard to vibration executed by observers assigned to that duty by Admiral Rodgers. This last-named report is the basis of the judgments of the undersigned as to the merits of the several sites, so far as that matter is concerned.

"With this preliminary the undersigned beg leave to present successively the results of their examination of the several sites in the order in which they were visited."

To this I might add, that as westerly winds are most favorable for observing, smoke and currents of heated air arising to the westward of the meridian line of an astronomical instrument should be principally guarded against.

Accepting the foregoing as a proper and necessary exposition of the needs of the observatory, I now quote from their report the reason assigned by the professors for selecting:

1. Barber Place.

The immediate topography of this place is very favorable to the construction of an observatory. It presents an ample space for building, and commands a clear horizon in all directions. It is remote from any public road, being only approachable by a private carriage path, so that it enjoys the inestimable advantages of seclusion, quiet, and freedom from disturbance, either by frequent visitors or by passing vehicles. At the same time the approach is sufficiently easy to make access at any time conveniently practicable to all persons who may justifiably seek access to the observatory. The site is protected against prospective encroachment by deep ravines in the vicinity, which are likely long, and perhaps forever, to prevent its being hemmed in by buildings, whatever may be the growth of the city. There are no exposed surfaces of rock, or earth, or public roads in the neighborhood to produce atmospheric currents. In short, considering its present condition only, there are no objections apparent to the adoption of this location for the site of the observatory.

It has been suggested, however, that possibly a branch of the Baltimore and Ohio Railroad may be brought through the valley of Rock Creek, which forms one of the ravines on the east of this place; and one of the questions addressed by the chairman of the commission to the undersigned relates to the probable effect which the construction of such a work in that quarter may have upon the suitableness of the site. In reply, it may be said that the course of the creek is so tortuous that no engineer would think of following it closely; that the point in which it makes the nearest approach to the site under consideration, and where only a railroad would be likely to occasion serious annoyance, is at the summit of the curve of a

deep oxbow, which would almost certainly be cut off by the line of a road laid down by any intelligent engineer, and that line carried in this manner, generally along the left bank of the stream, would be nearly a mile distant from the observatory and separated from it by all the depth of the gorge. Furthermore, it is certain that no branch railway or railway of any kind can be constructed through this valley without the permission of Congress, and it is worth considering whether Congress might not properly refuse to grant to any private corporation the right to construct a railway or other work likely to interfere with the usefulness of a public institution of the importance of the Naval Observatory. It is not possible to pronounce with positiveness that railroad trains passing along a track at the foot of the bend would produce no tremors at all at the proposed site here under consideration, though the probability is that such would not be serious. It is, however, quite possible for Congress to say that no such trains shall pass there.

During the last ten years the wonderful growth of Washington and the activity in real estate throughout the entire District of Columbia have caused numerous and persistent demands for greater facilities of communication. Out of them have grown the Tennallytown Electric Railway, with its power house in the immediate vicinity of the new Naval Observatory, the projected extension of Massachusetts avenue and the scheme for opening other streets within the area of the proposed Observatory Circle, all of which tend to nullify the important advantages whose existence determined the selection of Barber Place by the experts consulted in 1880. If these advantages are to be preserved to the new Observatory in any considerable degree, legislation must be had to establish satisfactory relations between its instruments and their surroundings, and to prevent future encroachments. Without such legislation the new site will soon be little better than the one occupied for the last forty years, and a half million dollars will have been expended in vain.

Ten copies of "Plan of the buildings and grounds of the United States Naval Observatory," which purport to be a careful and accurate survey, showing the Observatory site, Massachusetts avenue extended, and the various plats of ground recommended, respectively, to be sold and purchased, are herewith forwarded. Additional copies can be furnished if required.

Very respectfully,

F. V. McNAIR,
Captain, U. S. Navy, Superintendent.

The CHIEF OF THE BUREAU OF EQUIPMENT,
Navy Department.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 372.

IN THE SENATE OF THE UNITED STATES.

MAY 2, 1894.—Ordered to be printed.

Mr. GORMAN, from the Committee on Printing, submitted the following

REPORT:

[To accompany Senate resolution to authorize the Committee on Agriculture and Forestry to have printed so much as they may deem necessary of the evidence and other information obtained by that committee in relation to the "condition of agriculture," under Senate resolution of April 19, 1892.]

The Committee on Printing, to whom was referred the accompanying resolution, having considered the same, report it back with amendments, and as amended recommend its passage.

The committee proposes amendments as follows:

AMENDMENTS PROPOSED.

In line 2, after the word "printed," insert the words "in the usual number."

At the end insert "not to exceed twelve hundred octavo pages."

The limit proposed by the amendment is in conformity with the estimate furnished this committee by the Committee on Agriculture and Forestry.

The Public Printer estimates the cost of the resolution as amended at $2,904.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 373.

IN THE SENATE OF THE UNITED STATES.

MAY 3, 1894.—Ordered to be printed.

Mr. DAVIS, from the Committee on Military Affairs, submitted the following

ADVERSE REPORT:

[To accompany S. 1594.]

For the reasons set forth in the annexed communications from the War Department the indefinite postponement of this bill is recommended.

WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE,
Washington, February 21, 1894.

SIR: I have the honor to return herewith Senate bill No. 1594, "To remove certain disabilities of the late acting assistant surgeons," which has been referred to the Department by the Senate Committee on Military Affairs.

Acting assistant or contract surgeons were civilian employés of the Government—employed under contract to perform service at a specified compensation for limited periods.

For the purpose of removing "certain disabilities" of this class of former employés this bill provides that those "whose services were honorably terminated *shall* be commissioned by the President of the United States as acting assistant surgeons of the U. S. Army, and the date of employment as acting assistant surgeons to be the date of commission and muster into service, and the date of the honorable termination of service * * * to be the date of discharge or muster out of service."

The nature of the disabilities which this bill is intended to remove is not explained therein, but in a House bill of similar purport (H. R. 5837), copy herewith, it is explained that the object is to give the acting assistant surgeons the status of commissioned officers to enable them to be admitted to military organizations, such as the Loyal Legion and the Grand Army of the Republic, to which they are now denied admission.

It is a fact that the employés referred to were not commissioned officers of the Army during their respective terms of service, and it is not believed that this fact can be obliterated or changed by legislative or executive action.

The power to commission officers to fill vacancies in the Army, created by law, is vested in the President alone, by and with the advice and consent of the Senate; and the House Military Committee, in the Fifty-first Congress, in reporting adversely a similar bill (H. R. 8282), said that "if it is designed to be mandatory it would be unconstitutional." (House Report 2802, Fifty-first Congress—copy herewith.)

In the Fifty-first Congress, besides House bill No. 8282, reported adversely, as stated above, a bill was reported (as a substitute for H. R. No. 601) and passed the House January 7, 1891 (*see* H. R. 9601, Fifty-first Congress—copy herewith), providing for the issue of certificates of honorable service to the contract surgeons, instead of commissions; and in the Fifty-second Congress a bill directing the issue of commissions was adversely reported by the House Military Committee (H. R. No. 278 and House report No. 1067, Fifty-second Congress—copies herewith).

While there may be no special objection to the enactment of a measure such as that embodied in the bill which passed the House in the Fifty-first Congress, there are serious objections to the enactment of such a law as is proposed in the present bill.

Very respectfully,

GEO. D. RUGGLES,
Adjutant-General.

The SECRETARY OF WAR.

WAR DEPARTMENT, SURGEON GENERAL'S OFFICE,
Washington, February 28, 1894.

SIR: I have the honor to return herewith Senate bill No. 1594, referred to the Department by the Senate Committee on Military Affairs.

During and since the war civilian physicians under contract ("acting assistant surgeons") have frequently performed all of the professional and administrative duties required of a medical officer of the Army on duty at a military hospital or with troops in the field. And in not a few instances these contract physicians have distinguished themselves by their devotion to duty and heroic conduct upon the field of battle.

I am heartily in favor of any measure that proposes to recognize in a proper way the services of civilian physicians who performed the duties of medical officers during the war of the rebellion. But to give a commission to every doctor who has served under contract for three months since the war, as proposed in this bill, would detract greatly from the value of such a commission to the physicians who served during the war, in many instances from patriotic motives rather than for the compensation received.

Senate bill 1594 is entitled "A bill to remove certain disabilities of the late acting assistant surgeons." As I understand the matter, there are no disabilities to be removed, and when a civilian physician under contract receives the stipulated pay and allowances of an "acting assistant surgeon," the Government is under no further obligations to him. The conferring of honorary commissions for services rendered during the war would be practically equivalent to conferring a medal of honor, which can not be claimed as a right, but is a recognition by Congress of patriotic services or heroic conduct. To confer such commissions or medals indiscriminately upon all physicians who have served for three months during or since the war would evidently make the honor of little account to the recipients.

No such *grade* as that of "acting assistant surgeon" is or has been known to law as a part of the organization of the U. S. Army; the term originated during the war of the rebellion and was applied to civilian physicians who, in seasons of emergency, were employed under contract in a similar manner as were hundreds of other citizens employed in other departments.

The appropriation bills provided money to pay "for service of private physicians" (Army appropriation, 1848, 1862–'63–'64); for pay of "citizen surgeons" and "citizen physicians" (Army appropriation, 1865); for "compensation of citizen physicians" (Army appropriation, 1866–'67–'68); for "hire of contract surgeons." (Army appropriation, 1881–'82–'83–'84.)

Army Regulations define the status of contract surgeons as follows: "They are placed in the position of commissioned officers *so far as relates* to their duties as surgeons." (A. R. 2286, edition of 1881.)

The Treasury Department has decided that "acting assistant surgeons are neither officers nor enlisted men in the military service." (Op. Sec. Comp., May 9 and June 30, 1888.)

The Judge-Advocate-General has also decided that "a contract or acting assistant surgeon is not a military officer and has no military rank or status."

There are now living about 8,000 physicians who have served three months or longer under contract as "acting assistant surgeons" who would be entitled to receive honorary commissions if this bill should become a law.

Very respectfully,

GEO. M. STERNBERG,
Surgeon-General U. S. Army.

The SECRETARY OF WAR.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 374.

IN THE SENATE OF THE UNITED STATES.

MAY 3, 1894.—Ordered to be printed.

Mr. PASCO, from the Committee on Claims, submitted the following

REPORT:

[To accompany S. 1963.]

The Committee on Claims, to whom was referred the bill (S. 1963) for the relief of the sureties of Dennis Murphy, have carefully considered the same and submit the following report thereon:

This case was before the Senate Committee on Claims during the Fiftieth Congress; it had before then been favorably considered in the House Committee on War Claims during the Forty ninth Congress. The report made by the House committee was carefully prepared and set forth the facts of the case fully and clearly. The Senate committee of the Fiftieth Congress adopted this as a part of their report, and it is here given at length:

The Committee on War Claims, to whom was referred the bill (H. R. 4811) for the relief of the sureties of Dennis Murphy, report the same back with a favorable recommendation, and in support of their recommendation, make the following statement:

Dr. Dennis Murphy, now deceased, was appointed in 1858, with the consent of the Senate, paymaster and military storekeeper at the national armory at Harpers Ferry, Va., and on the 28th of April, 1858, executed the bond required by law, in the penalty of $50,000, with Allen C. Hammond, George Siebert, William Megary, and Charles J. Faulkner as sureties.

From the date of his qualification to January 1, 1861, the accounts of said Murphy were rendered every quarter to the entire satisfaction of the Government, and with a fidelity and accuracy not to be surpassed in a disbursing officer. His next settlement, for the quarter ending March 31, 1861, was, as appears by the statement of his clerk, promptly made out as usual and signed, but could not be transmitted to Washington, because the superintendent of the armory, A. M. Barbour, whose signature was also necessary, was absent attending the Virginia State convention as a member thereof. Said Barbour did not return to Harpers Ferry until after the ordinance of secession was passed and the place in occupancy of the Confederate troops.

The official residence of said Murphy was occupied by the Confederates, and it further appears that, before their evacuation of Harpers Ferry, a subordinate officer, contrary to the orders of Gen. Johnston, broke open the vault containing Murphy's papers and vouchers, and in the evacuation and the subsequent occupation by Federal troops these were scattered and, with a single exception (a payroll for February, 1861), were lost or destroyed. Said Murphy, on being dispossessed of his house, removed to Winchester, Va., with his family. The above payroll being found on the street by a citizen of Harpers Ferry was in time forwarded to the Ordnance Department.

In July, 1861, Murphy was removed, and, on the adjustment of his accounts, a balance stood against him on the books of the Treasury of $57,518.52.

The summaries, however, for each month forwarded to the Ordnance Department by the storekeeper for the months of January, February, and March, 1861, official copies of which have been examined by your committee, reduce this nominal balance to the amount of $10,153.06 on the 31st of March, 1861, which he reports as follows:

In hands assistant treasurer, New York	$8,272.38
In hands depository, Baltimore	1,879.68
	10,153.06

Of the first sum, $5,840.95 remained on April 29, 1861, and was transferred to the Treasury of the United States, and checks for the residue were issued between April 1 and 14 and paid by the depository. Checks for more than the amount reported in the Baltimore depository were also drawn after April 1, 1861.

It will thus be seen that, while no legal settlement could be made by the Comptroller allowing said Murphy credit for said nominal balance of $57,518.52 on the books of the Department, there existed in the Department very persuasive evidence that he had fully accounted for the public funds in his hands.

Dr. Murphy lived for some eight or ten years after the war, and was never called on to make any further settlement of his accounts, nor were his sureties ever notified that any settlement was needed. In 1876, while one of said sureties, Mr. Faulkner, was a member of Congress, they were first officially notified that the books of the Treasury showed the above balance due from Murphy. A petition was then filed by Allen C. Hammond, one of said sureties, setting forth substantially the above facts, and praying relief at the hands of Congress. That petition, being referred to the Ordnance Department by Hon. A. A. Hardenbergh, the Chief of Ordnance, after stating the facts shown by his office, gave the folowing opinion:

"In my opinion the sureties of military storekeeper Murphy should be relieved from responsibility under their bond."

Mr. Faulkner being then, as stated, a member of the House, declined to have any action taken looking to his relief. All the sureties of Murphy are now dead, their estates generally settled, and some of them insolvent. Murphy himself died insolvent. In view of all these facts above set forth, in view of the long delay by the Government in notifying the sureties, the utter impossibility of having any settlement now that could be verified and just, it seems to the committee that it is but fair to pass this bill and relieve the estates of any of the descendents whose estates are solvent of the shadow of this stale claim. This view is the more confirmed by the almost conclusive evidence that there was never anything actually due the Government from Murphy.

The committee approve the indorsement of the Ordnance Department on Hammond's petition and a letter from the present Second Auditor of the Treasury recommending the passage of this bill, and report the same favorably.

Indorsements on letter of the Hon. A. A. Hardenbergh, dated House of Representatives, February 21, 1876, inclosing the memorial of Allen C. Hammond, in behalf of himself and the other securities of Dennis Murphy, and requesting that copies of the letters and papers in the case be furnished.

[First indorsement.]

ORDNANCE OFFICE, WAR DEPARTMENT,
Washington, February 28, 1876.

Respectfully submitted to the Secretary of War.

The statements of the petitioners as to the appointment of Dennis Murphy as military storekeeper, the date of his bond, and the prompt and satisfactory rendition of his accounts up to December 31, 1860, are corroborated by the records of this office.

The last regular cash account rendered by Military Storekeeper Murphy was for quarter ending December 31, 1860. His monthly statement of funds received and expended for the months of January, February, and March, 1861, were forwarded, and show a balance on March 31, 1861, of $10,153.06 due the United States (see statement marked A), but no vouchers in support of disbursements since December 31, 1860, have been received except the February pay-roll found after or about the time of the destruction of Harper's Ferry, and forwarded by this office to Second Auditor.

The last settlement by the Treasury Department known to this office was in 1861, when Military Storekeeper Murphy received credit for the payments made on February roll, amounting to $15,609.49, and a balance of $5,840.95 found to his credit with assistant treasurer, New York, and turned into the Treasury of the United States. By this last settlement he is shown to be a debtor to the United States in the sum of $57,518.52 (see statement marked B).

Accompanying are statements showing checks drawn by Military Storekeeper Murphy on assistant treasurer New York, and depository, Baltimore, from January, 1861, to April, 1861. (See statements marked C and D.)

If all the checks thereon reported were drawn in favor of public creditors, and from the balance shown to be on hand December 31, including remittances after that date, as shown by statement B, it would seem that he had accounted for all the public money intrusted to him.

Copies of his accounts current for quarter ending December 31, 1860, and of his monthly statement of receipts and expenditures for December, 1860, are appended, marked E.

The Second Auditor of the Treasury is charged by law with the examination and settlement of the accounts of ordnance disbursing officers, and with instituting proceedings against delinquents or defaulters.

The official settlements in this case are on file in his office, and it is suggested that these papers can be verified by reference to him. In my opinion the sureties of Military Storekeeper Murphy should be relieved from responsibility under their bond.

S. V. BENÉT,
Brig. Gen., Chief of Ordnance.

[Second indorsement.]

WAR DEPARTMENT,
March 1, 1876.

Respectfully referred to the Second Auditor of the Treasury for his views.
By order of the Secretary of War.

H. T. CROSBY,
Chief Clerk.

[Third indorsement.]

TREASURY DEPARTMENT,
SECOND AUDITOR'S OFFICE,
March 6, 1876.

Respectfully returned to the War Department. Dennis Murphy, late military storekeeper, Harper's Ferry Armory, rendered accounts, with vouchers, to include December 31, 1860, to this office, through the Ordnance Bureau of the War Department, and a settlement was made July 22, 1861, showing his indebtedness to the United States on the books of this office in the sum of $73,128.01. On July 2, 1861, the Ordnance Office received a roll of hired men for February, 1861, at Harper's Ferry Armory paid by Dennis Murphy, amounting to the sum of $15,609.49. This roll was referred to me for settlement. On July 26, 1861, said roll was allowed, which reduced Dennis Murphy's indebtedness to the sum of $57,518.52.

The accounting officers of the Treasury can not allow any disbursing officer credit for disbursements made unless vouchers are produced; nor can they relieve sureties from any responsibility of their principals. It is for Congress to afford relief if the wisdom of that body deems it proper.

E. B. FRENCH,
Auditor.

TREASURY DEPARTMENT,
June 29, 1886.

SIR: I have the honor to forward herewith report of the Second Auditor of this date upon H. R. 4811 for the relief of the sureties of Dennis Murphy, in compliance with your request to him of the 25th instant.

Respectfully, yours,

W. E. SMITH,
Assistant Secretary.

Hon. WILLIAM L. WILSON,
House of Representatives.

TREASURY DEPARTMENT, SECOND AUDITOR'S OFFICE,
Washington, D. C., June 29, 1886.

SIR: I am in receipt of your favor of the 25th inst., asking me to examine House bill 4811 for the relief of the sureties of Dennis Murphy and give my opinion as to the justice of and necessity for passing the same. As my opinion will be governed by the facts in the case I will recite as briefly as possible such as appear to be material, which are as follows:

Dennis Murphy was appointed military storekeeper of ordnance April 7, 1858, and gave bond in the penal sum of $50,000, his sureties being Allen C. Hammond, George Seibert, William McGary, and Charles J. Faulkner, all then of Berkeley County, Virginia. He was on duty as paymaster at Harper's Ferry Armory until about the time that establishment was set on fire and abandoned by United States troops, April 18, 1861, and was summarily dismissed July 19, 1861, for failure to render his

accounts. The last complete accounts received from him were for the quarter ending December 31, 1860. On final settlement a balance of $57,518.82 was declared to be due from said Murphy and still stands against him on the books of this office, though there is reason to believe that if his accounts had been promptly rendered it would have been found that he had expended nearly all the public money for which he is held accountable in defraying the current expenses of the armory.

In April, 1862, the Second Comptroller requested that Murphy's accounts be prepared for suit, but the request does not appear to have been complied with; probably neither Murphy nor his sureties could then have been reached by process of law. In December, 1875, the Auditor called the Comptroller's attention to the condition of the accounts, and was instructed to make demand upon Murphy's sureties. This was done, but only one responded, namely, Hon. Charles J. Faulkner, then a Representative in Congress, who stated that while he remembered having recommended Murphy's appointment, he had no recollection of having become a surety upon his official bond. Mr. Faulkner called at this office several times, and at his request action was suspended in order that he might obtain relief from Congress. Nothing seems to have been done until after Mr. Faulkner's death in November, 1884, when demand was made upon the administrators of his estate. The bill now before me is no doubt the result of that demand.

It is stated that Murphy was possessed of considerable property in West Virginia, which he sold after the war and entered into business in Baltimore, where he died insolvent about the year 1873. William McGary is also said to be dead. No information as to Allen C. Hammond and George Seibert is on record, but an impression seems to have prevailed that Mr. Faulkner, who was reported to be worth between $200,000 and $300,000, was the only responsible surety.

Assuming that it was impossible to force a settlement with Murphy or his sureties during the war, the following facts remain:

1. Although eight years elapsed between the close of the war and Murphy's death no attempt was made to obtain a settlement with him. He was not even notified of the condition of his accounts.

2. The sureties were not notified that their principal was in default until more than seventeen years after the date of the bond and more than ten years after the close of the war—he, in the meantime, having died insolvent. Altogether, more than twenty-five years have been suffered to pass since the principal became in default without decisive action on the part of the Government.

In view of these facts I am of opinion that the sureties on the official bond of Dennis Murphy may justly be released from all liability by reason of such suretyship.

With regard to the necessity of passing the accompanying bill, I would say that, with the exception of section 3469, Revised Statutes, which authorizes the Secretary of the Treasury to accept offers of compromise under certain circumstances, there is no law under which the sureties of a defaulting military disbursing officer can be released from their liability. As laches can not be imputed to the Government, no matter how long a case may have been neglected, and as there is no general statute of limitation touching official bonds, the sureties of Dennis Murphy must obtain special relief from Congress or pay the penalty.

In this connection I respectfully invite attention to the fact that there are statutes prescribing limitations on suits against the sureties of certain classes of disbursing officers. For example, no suit on a United States marshal's bond can be maintained unless it be commenced within six years after the right of action accrues (section 786, Revised Statutes), and suit on the bond of a postmaster must be commenced within three years after the close of his accounts, otherwise the sureties are not liable (section 3838, Revised Statutes).

A general statute of limitation on this subject is desirable.

Very respectfully,

WM. A. DAY, *Auditor.*

Hon. WM. L. WILSON, *House of Representatives.*

The bill was passed in the Senate but no final action was taken in the House. During the Fifty-first Congress a similar report was made by the committee and the Senate took favorable action upon the bill with the same result as before. Like action followed during the Fifty-second Congress.

The case having been again examined and the bill being the same as has before been favorably considered by the Senate it is recommended that it do pass.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 375.

IN THE SENATE OF THE UNITED STATES.

MAY 3, 1894.—Ordered to be printed.

Mr. PALMER, from the Committee on Pensions, submitted the following

REPORT:

[To accompany S. 1957.]

The Committee on Pensions, having had under consideration the bill (S. 1957) to increase the pension of Joseph W. Fisher, recommend that the same be amended and, as amended, pass.

The object of the bill is to increase the pension of Gen. Joseph W. Fisher, late colonel of the One hundred and ninety-fifth Regiment of Pennsylvania Volunteers, from $30 per month to $72 per month.

Gen. Fisher, at the breaking out of the civil war, entered the service as a lieutenant-colonel of the Fifth Pennsylvania Reserves, and in July, 1862, he was promoted to the colonelcy of the regiment. He served as such for a full term of three years, the time of enlistment. Being mustered out he raised the One hundred and ninety-fifth Regiment Pennsylvania Volunteers, and at the expiration of their term ot enlistment he again raised a regiment known as the One hundred and ninety-fifth Regiment Pennsylvania Volunteers. He continued in the service until January 31, 1866, when he was finally mustered out.

He was engaged in all the battles in which his regiments participated, frequently received the compliments of his superior officers, was recommended for the position of brigadier-general, and was appointed brigadier-general by brevet in 1865. He performed conspicuous service at the famous Little Round Top at the battle of Gettysburg.

At the time Gen. Fisher first enlisted he was past the military age, but he served during the entire war and came out of the war broken down in health, and has suffered from the exposures and hardships of the war ever since. He has had four different strokes of paralysis; he is 80 years old and is well-nigh helpless. He is by profession a lawyer. He held the office of associate justice and the office of chief justice of the supreme court of the Territory of Wyoming for a number of years. He has no means of support, and is totally disabled for mental and physical work.

A petition signed by several hundred representative citizens of his town (which is hereto annexed with the omission of the signatures) gives a statement of his condition mentally and physically; while the affidavits of two representative physicians, who are members of the pension board of examiners (hereto annexed and made a part of this report), confirm the statements contained in the petition.

The committee recommend that the bill be amended by striking out in lines 6 and 7 of the bill the words "one hundred" and inserting in lieu thereof the words "seventy-two," as this will grant to Gen. Fisher a pension equivalent to that provided for privates in the volunteer service who are totally disabled.

To the Honorable the Members of the Senate and House of Representatives of the Congress of the United States:

GENTLEMEN: We, the undersigned, citizens of the United States, do hereby most respectfully petition your honorable body to grant a pension to Gen. Joseph W. Fisher, formerly of the State of Pennsylvania, and for twenty-three years last past a resident of Wyoming.

Gen. Fisher's military record, which is part of the history of the late civil war, is, briefly, as follows: He entered the service in May, 1861, as lieutenant-colonel of the Fifth Pennsylvania Reserves; in July, 1862, he was promoted to the colonelcy of the regiment; he served as such for the full three years' time of enlistment. When he was mustered out he raised the One hundred and ninety-fifth Regiment Pennsylvania Volunteers for one hundred days' service, being colonel of the regiment, and at the expiration of that term again raised a new regiment known as the One hundred and ninety-fifth Regiment Pennsylvania Volunteers, of which he was colonel, and continued in service until January 31, 1866, when he was finally mustered out of service.

During all his terms of service, Gen. Fisher was engaged in all the battles in which his various regiments participated and was frequently complimented in orders by his superior officers, all of whom recommended him for promotion to a brigadier-generalship, and he was appointed brigadier-general by brevet in November, 1865. His chief achievement as an officer was the taking and holding of Little Round Top, at the battle of Gettysburg, at a critical juncture in that battle, which fact was well known throughout the Army.

At the time he was finally mustered out of service he was suffering from disability caused by exposure and hardship in war and has ever since been in feeble health in consequence. He has sustained four strokes of paralysis and is now suffering from the effects of the last, being unable to speak fluently and being extremely weak. He is 80 years of age, and has been for about four years last past and is now absolutely unable to follow his profession as a lawyer (he was chief justice of Wyoming from 1871 to 1879), and will never recover sufficiently to engage in any business or employment. That he is without means of support. Your petitioners, therefore, pray that a reasonable pension be granted Gen. Fisher, believing that no more worthy case has appealed to the sense of justice of your honorable body.

(Here follows nearly three hundred signatures.)

STATE OF WYOMING, *county of Laramie, ss:*

CHEYENNE, WYO., *April 13, 1894.*

To whom it may concern:

This is to certify that I was called to attend, professionally, Hon. J. W. Fisher, of this city, on December 2, 1890, he being the subject of apoplexy, with right hemiplegia, labial paralysis, and amnesia aphasia. My attendance continued daily until the 18th of December, 1890, and occasional visits for a variable period; the dates of the visits have not been kept. At no time since the attack of December, 1890, has he been in a condition, either mental or physical, to attend to any kind of business, and, owing to his advanced age, never will be able to earn a livelihood in any manner. While, in certain respects, he has improved slightly, yet it is not of a character to hope for improvement, as the attack may recur at any moment and place him in a more deplorable state than he has yet been in.

ROBERT B. GRIMES, M. D.,
Late A. A. Surgeon, U. S. A.

Subscribed and sworn to before me this the 14th day of April, A. D. 1894.

W. P. CARROLL,
Justice of the Peace.

To whom it may concern:

This is to certify that I have attended Joseph W. Fisher professionally at various times within the past year, and that I find his physical condition to be such as to totally disable him from manual labor of any sort whatever. He has "amnemonic aphasia," resulting from senile degeneration, which unfits him from all business pursuits where memory, a normal coordination in thought, and a concise manner of expression are required.

His condition during a greater portion of the past six months has been such as to require the services of an attendant to supply his wants; having been afflicted with a catarrhal inflammation of the ears, which resulted in the perforation of the drums of both ears and an almost entire loss of hearing of the right one.

Taking into consideration his age and his present condition of general senile degeneration it is quite probable that he will require the care of an attendant most, if not all of the time, of the remaining period of his life.

GEO. P. JOHNSTON, M. D.,
Secretary Board U. S. Examining Surgeons, Cheyenne, Wyo.

APRIL 7, 1894.

THE STATE OF WYOMING, *County of Laramie, ss:*

George P. Johnston, being first duly sworn, deposes and says that the facts contained in the foregoing statement are true.

GEO. P. JOHNSTON, M. D.

Subscribed and sworn to before me this 11th day of April, A. D. 1894.
[SEAL.]
LOUISE S. SMITH,
Notary Public.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 376.

IN THE SENATE OF THE UNITED STATES.

MAY 4, 1894.—Ordered to be printed.

Mr. PASCO, from the Committee on Military Affairs, submitted the following

ADVERSE REPORT:

[To accompany S. 1273.]

The Committee on Military Affairs to whom was referred the bill (S. 1273) for the relief of Bernard J. D. Irwin, submit the following report thereon:

The claimant was an assistant surgeon in the U. S. Army on duty at Fort Buchanan, Ariz., in the early part of 1861, about the time of the beginning of hostilities in the late war. In June he was ordered to proceed to Fort Fillmore, N. Mex., and turned his baggage and personal effects over to the post-quartermaster for transportation. Early in August while on his way to his new post of duty along with four companies of U. S. troops, word came that Fort Fillmore had surrendered to a body of Confederates from Texas, and that a hostile force at a distance of one day's march was preparing to surprise the four companies under Capt. Moore, the detachment with which Dr. Irwin was serving. Capt. Moore thereupon changed his route, ordered all the public and private property in the train, except such articles of food, clothing, and equipments as individuals could carry on their persons, to be destroyed, and 55 wagons with their contents (included in which were the baggage and personal effects of Dr. Irwin), were burned. The infantry soldiers were mounted on the wagon mules and the force reached Fort Craig, N. Mex., in safety.

The claimant exhibits a schedule of the property belonging to him which was destroyed with this train, and he has valued it at $2,286, the amount mentioned in the bill.

The case was submitted to the Court of Claims by the Committee on War Claims of the House of Representatives under the act of March 3, 1883, known as the Bowman Act, but the court found that as the matter grew out of destruction of property by the Army during the late war it was not within the jurisdiction of the court.

The destruction of property in time of war in connection with military operations creates no legal obligation upon the Government to make compensation to the owner. This doctrine has been declared and recognized by authority of very high character, and there are no special circumstances why relief should be granted in this case simply as a matter of bounty.

The committee therefore report adversely upon the bill before them and recommend its indefinite postponement.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 377.

IN THE SENATE OF THE UNITED STATES.

MAY 7, 1894.—Ordered to be printed.
MAY 12, 1894.—Ordered to be reprinted.

Mr. TELLER, from the Select Committee on the Five Civilized Tribes of Indians, submitted the following

REPORT:

The Senate on the 29th of March, 1894, adopted the following resolution:

Resolved, That the Committee on the Five Civilized Tribes of Indians, or any subcommittee thereof appointed by its chairman, is hereby instructed to inquire into the present condition of the Five Civilized Tribes of Indians, and of the white citizens dwelling among them, and the legislation required and appropriate to meet the needs and welfare of such Indians; and for that purpose to visit Indian Territory, to take testimony, have power to send for persons and papers, to administer oaths, and examine witnesses under oath; and shall report the result of such inquiry, with recommendations for legislation; the actual expenses of such inquiry to be paid on approval of the chairman out of the contingent fund of the Senate.

In pursuance to this resolution three of the members of the Committee on the Five Civilized Tribes of Indians, viz, Messrs. Teller, Platt, and Roach, visited Indian Territory, arriving at Muscogee on the 8th of April, and after conferring with representatives of the Indians, the white citizens, and white residents who have no right of citizenship, and also with representatives of the colored race residing in the Territory, left the Territory on the 17th of April.

Without deeming it necessary to give a detailed account of the proceedings of the committee in the Territory or elsewhere, we submit herewith a statement of the facts ascertained and the conclusions drawn therefrom.

The Indian Territory contains an area of 19,785,781 acres, and is occupied by the five civilized tribes of Indians, consisting of the Cherokees, Creeks, Choctaws, Chickasaws, and Seminoles. Each tribe occupies a separate and distinct part, except that the Choctaws and Chickasaws, though occupying separately, have a common ownership of that part known as the Choctaw and Chickasaw territory, with rights and interests as recognized in their treaties as follows: The Choctaws, three-fourths, and the Chickasaws, one-fourth.

The character of their title, the area of each tribe, together with the population and an epitome of the legislation concerning these Indians during the last sixty-five years, is shown by the report of the Committee on Indian Affairs, submitted to the Senate on the 26th day of July, 1892, and we insert so much of said report as touches on the points above mentioned.

With reference to the present relations between the U. S. Government and the five civilived tribes, and the advantages to be derived by the Indians as well as the United States by the surrender of such governments and their incorporation into our system, the committee submits the following summary:

(1) *Cherokees.*—In the preamble to the treaty of May 6, 1828, the United States guarantees the Cherokee Nation, in their lands west of the Mississippi, a permanent home "that shall never, in all future time, be embarrassed by having extended

around it the lines, or placed over it the jurisdiction of a Territory or State, nor be pressed upon by the extension, in any way, of any of the limits of any existing Territory or State." (7 Stats., p. 311.) By the fifth article of the treaty of December 29, 1835, the United States agreed that the lands ceded to the Cherokees by that treaty should, in no future time, without their consent, be included within the territorial limits or jurisdiction of any State or Territory. But they should secure to the Cherokee Nation the right, by their national councils, to make and carry into effect all such laws as they might deem necessary for the government and protection of the persons and property within their own country belonging to their people, or such persons as had connected themselves with them, if not inconsistent with the Constitution of the United States and such acts of Congress as had been or might be passed, regulating trade and intercourse with the Indians. (7 Stats., p. 481.) By the seventh article of said treaty it is stipulated that the Cherokee Nation "shall be entitled to a Delegate in the House of Representatives of the United States whenever Congress shall make provision for the same" (p. 482).

By the second article of the treaty of August 6, 1846, it is provided that "laws shall be passed for equal protection, and for the security of life, liberty, and property; and full authority shall be given by law to all or any portion of the Cherokee people, peaceably to assemble and petition their own government, or the Government of the United States, for the redress of grievances, and to discuss their rights." (9 Stats., p. 872.) The laws provided in this article, it is presumed, are such as were thereafter to be enacted by the Cherokee council.

The fourth and fifth articles of the treaty of 1866 contain stipulations concerning Cherokees, freed persons, and free negroes who may elect to reside in a specified district within the Cherokee domain, and the sixth article provides as follows:

"The inhabitants of the said district hereinbefore described shall be entitled to representation according to the number in the national council, and all laws of the Cherokee Nation shall be uniform throughout said nation; and should any such law, either in its provisions or in the manner of its enforcement, in the opinion of the President of the United States, operate unjustly or injuriously in said district, he is hereby authorized and empowered to correct such evil, and to adopt the means necessary to secure the impartial administration of justice as well as fair and equitable application and expenditure of the national funds as between the people of this and every other district in said nation." (14 Stats., 800.)

In article 12 the Cherokees give their consent to a general council consisting of delegates elected by each nation or tribe lawfully residing within the Indian Territory, to be annually convened in said Territory, with powers as therein prescribed. The sixth subdivision of this article reads as follows:

"The members of said council shall be paid by the United States the sum of four dollars per diem during the term actually in attendance on the sessions of said council, and at the rate of four dollars for every twenty miles necessarily traveled by them in going from and returning to their homes, respectively, from said council, to be certified by the secretary and president of the said council." (*Ibid.*, 803.)

The twenty-second article provides for the survey and allotment of their lands whenever the national council shall request it. (*Ibid.*, 803.)

By the twenty-sixth article the Cherokees are guaranteed peaceable possession of their country and protection against domestic feuds, insurrections, hostile tribes, and intrusion from all unauthorized citizens of the United States; and by the thirty-first article thereof it is expressly stipulated that nothing therein contained shall be construed as a relinquishment by the Cherokee Nation of any claims or demands under the guaranties of former treaties, except as therein expressly provided (p. 805).

(2) *Chickasaws.*—By the second article of the treaty of May 24, 1834, the United States consented to protect and defend them in their home west of the Mississippi, when selected, against the inroads of any other tribe of Indians, and from whites, and agreed to keep them without the limits of any State or Territory. (7 Stats., p. 450.)

By the seventh article of the joint treaty of April 28, 1866, with the Choctaws, the Chickasaws and Choctaws agreed to such legislation as Congress and the President of the United States might deem necessary for the better administration of justice and the protection of the rights of person and property within the Indian Territory: *Provided, however,* That such legislation should not in anywise interfere with or annul their present respecive legislatures or judiciaries or the rights, laws, privileges, or customs of said nations, respectively. (14 Stats., p. 771.)

This eighth article provided for a national council of the various tribes of Indian Territory, and the ninth clause thereof stipulates that "whenever Congress shall authorize the appointment of a delegate from said Territory it shall be the province of said council to select one from among the nations represented in said council" (p. 773).

The eleventh article provides for the survey and allotment of their lands, whenever their national councils should request it (p. 774). The Chickasaws did, by their legislative council, give said assent, but the Choctaw council has never agreed

thereto, the tenure of the lands being such as to require joint and concurrent action of the two bodies.

(3) *Choctaws.*—The fourth article of the treaty of September 27, 1830, granted the Choctaw Nation of Indians exclusive jurisdiction and self-government over the persons and property of the nation, so that no Territory or State should ever have a right to pass laws for the government of that nation and their descendants; and that no part of the land granted them should ever be embraced in any Territory or State, and further would secure forever said nation from and against all laws except such as from time to time might be enacted in their own national council, not inconsistent with the Constitution, treaties, and laws of the United States and except such as might be enacted by Congress in exercising legislation over Indian affairs as required by the Constitution. (7 Stats., p. 333.)

By the fifth article the United States guarantees protection to said Indians from domestic strife and foreign enemies on the same principles that the citizens of the United States are protected (p. 334), and by the twenty-second article the Choctaws express "a solicitude that they might have the privilege of a Delegate on the floor of the House of Representatives extended to them (p. 338).

By the seventh article of the joint treaty of April 28, 1866, they agree with the Chickasaws to the legislation hereinbefore recited under the head "Chickasaw." Provision for a Delegate to Congress is set forth in the eighth article, and for survey and allotment of lands in the eleventh article of said joint treaty. (*See* Chickasaw.)

(4) *Creeks.*—By the fourteenth article of the treaty of March 24, 1832, the Creek Nation of Indians are guaranteed a patent for their lands west of the Mississippi agreeably to the third section of the act of Congress of May 2 (28), 1830; also that no State or Territory should ever have a right to pass laws for the government of said Indians, but that they should be allowed to govern themselves, so far as might be compatible with the general jurisdiction which Congress might think proper to exercise over them. (7 Stats., p. 368.)

The fourth article of the joint treaty of August 7, 1856, with the Creek and Seminole Indians provides that no State or Territory shall pass laws for said tribes, and no portion of their lands defined in said treaty shall ever be embraced or included within or annexed to any Territory or State, nor shall either or any part of either ever be erected into a Territory without the full and free consent of the legislative authority of the tribe owning the same. (1 Stats., p. 700.)

The fifteenth article of said treaty secures the unrestricted right of self-government and full jurisdiction over person and property within their respective limits, excepting all white persons, with their property, who are not, by adoption or otherwise, members of either the Creek or Seminole tribe, so far as may be compatible with the Constitution of the United States and the laws made in pursuance thereof regulating trade and intercourse with the Indian tribes (p. 703).

The eighteenth article provides for the protection of said tribes of Indians from domestic strife, hostile invasion, and aggression by other Indians or white persons not subject to their jurisdiction and law (p. 704).

By the tenth article of the treaty of June 14, 1866, the Creeks agree to such legislation as Congress and the President of the United States may deem necessary for the better administration of justice and the protection of the rights of person and property within the Indian Territory: *Provided, however,* That said legislation shall not in any manner interfere with or annul their present tribal organization, rights, laws, privileges, and customs. (14 Stats., p. 788.)

(5) *Seminoles.*—By the seventh article of the treaty of March 21, 1866, the Seminoles agree to such legislation as Congress and the President of the United States may deem necessary for the better administration of justice and the protection of the rights of person and property within the Indian Territory: *Provided,* That said legislation shall not in any manner interfere with or annul their present tribal organization, rights, laws, privileges, and customs. (14 Stats., p. 758.)

Neither the Creeks nor Seminoles in any joint treaty, nor by this treaty of 1866, express any desire or wish upon the subject of a Delegate to Congress.

The Creeks having, on the 10th of July, 1861; the Choctaws and Chickasaws on the 12th of July, 1861; the Seminoles on the 1st of August, 1861, and the Cherokees on the 7th of October, 1861, made treaties, respectively, with the Confederate States, the President, by the Indian appropriation act of July 5, 1862 (12 Stats., p. 528), was authorized by proclamation to declare all treaties existing between the United States and said tribes to be abrogated, if, in his opinion, it could be done consistently with good faith and legal and national obligations. (*See* R. S., 2080.)

Not desiring to take advantage of or to enforce the penalties therein authorized, the President, in September, 1865, appointed a commission empowered to make new treaties with the tribes residing in the Indian Territory upon a basis containing seven propositions, the sixth of which was that "it is the policy of the Government, unless other arrangements be made, that all the nations and tribes in the Indian Territory be formed into one consolidated government after the plan proposed by the Senate of the United States in a bill for organizing the Indian Territory."

The representatives of the various tribes were assembled at Fort Smith and signed what is known as the Fort Smith treaty—made preliminary to the subsequent treaties of 1866.

The Cherokees held that "the consolidation of all the nations and tribes in the Indian Territory into one government is open to serious objection. There are so many, and in some instances antagonistic, grades of tastes, customs, and enlightenment that to throw the whole into one heterogeneous government would be productive of inextricable confusion; the plan proposed by the U. S. Senate may obviate the difficulties which now appear so patent to us." (*See* Annual Report of Commissioner of Indian Affairs for 1865, p. 306.)

The Chickasaws reported, "We thought the Government would first make a treaty of peace with us all. Indians are different from whites. They are vindictive; hatred lasts long with them. Not so with whites. The Government must settle the difficulty; the Indians can not. That done, let us be centralized, and a government established in the Indian Territory (p. 317)."

The Creeks reported that: "As to a Territorial form of government, we have to say that we know but little, but prefer our tribal condition (p. 341)."

The loyal Creeks signified to the Commissioner their entire assent to most of the propositions, including Territorial government (p. 341).

The Seminoles consented to the sixth proposition, then afterwards rescinded their action and asked that the question stand open for future consideration (p. 351).

In the subsequent treaties made in 1866 the Choctaws and Chickasaws by the seventh article, the Creeks by the tenth article, and the Seminoles by the seventh article, agreed, "to such legislation as Congress and the President of the United States may deem necessary for the better administration of justice and the protection of the rights of person and property within the Indian Territory: *Provided, however,* That such legislation shall not in anywise interfere with or annul their present tribal organization, or their respective legislatures or judiciaries, or the rights, laws, privileges, or customs."

Under the provision of these treaties the Indians have agreed that Congress may legislate for the better administration of justice and the protection of the rights of property and person within the limits of the present Indian Territory so far as it relates to the Choctaw, Chickasaw, Creek, and Seminole Indians.

Census Bulletin No. 25 gives the population of the Five Civilized Tribes, including colored Indian citizens and claimants, as 66,289, as follows:

Cherokee Indians	25,357	Colored	4,242	Total		29,599
Chickasaw Indians	3,464	do	3,718	do		7,182
Choctaw Indians	9,996	do	4,401	do		14,397
Creek Indians	9,296	do	5,341	do		14,632
Seminole Indians	2,539	do	22	do		2,561
						68,371
Deduct number of colored persons probably not members of tribes (estimated)						3,500
						64,871
Indians other than Chickasaws in that nation						1,161
Indians other than Choctaws in that nation						257
Population of the Five Civilized Tribes:						
Indians						52,065
Colored Indian citizens and claimants						14,224
Total						66,289

The same bulletin discloses the fact that there are white and colored persons not Indians or recognized as members of the Indian nations within the limits of the Five Civilized Tribes, as follows:

White persons in—	
Cherokee Nation	27,176
Chickasaw Nation	49,444
Choctaw Nation	27,991
Creek Nation	3,280
Seminole Nation	96
	107,989
Colored persons in the Five Civilized Tribes probably not members of the tribes (estimated)	3,500
Chinese in the Chickasaw Nation	6
Total	**111,493**

The following table shows the amount of land to which each man, woman, and child would be entitled if the lands were divided in severalty:

Statement showing per capita distribution of the whole reservation among the people of the respective tribes.

Tribe.	Area of the reservation.	If to persons of Indian blood only.		If to persons of Indian blood and to the colored persons claiming rights in the respective tribes, as set out in Census Bulletin No. 25.	
		Population.	Acres to each.	Population.	Acres to each.
Cherokees	5,031,351	25,357	198·4	29,559	170
Chickasaws	*4,650,935	3,464	1,342 6	7,182	647·5
Choctaws	*6,688,000	9,996	669	14,397	464·4
Creeks	3,040,495	9,291	327·3	14,632	207 7
Seminoles	375,000	2,539	147·7	2,561	146·4

*The lands held by the Chocktaw and Chickasaw Indians are held by them in common with rights and interests as recognized in their treaties as follows: The Choctaws, three-fourths; the Chickasaws, one-fourth.

At the breaking out of the rebellion the Five Civilized Tribes entered into treaties with the Confederate States, so called, and it was claimed had forfeited treaty rights.

But by the new treaties, however, former treaty rights, not inconsistent with the treaties of 1866, were restored and guaranteed by the United States.

At this time it seemed to be the policy of the Government to make an exclusive Indian Territory, to which should be removed other Indians, so that the whole Territory should become filled with Indian tribes alone. This policy of the Government seems to have included the idea of a Territorial Government, in which all of the tribes which might occupy the Indian Territory, as well as the Five Civilized Nations, should have representation after the manner of other Territoral organizations.

The territory which was to be thus organized into what might be called a distinctly Indian government was, until the organization of the Territory of Oklahoma, marked upon our maps and known as the Indian Territory, deriving that name from the plan of the Territorial organization already alluded to.

An article was inserted in each of the treaties made with the Five Civilized Tribes in 1866, by which they consented to become members of such Indian Territoral government. This article in the Cherokee treaty is article 12, and is identical with similar articles found in the other treaties. The president of the legislative council was to be designated by the Secretary of the Interior."

The plan thus proposed was never carried into execution; and a large part of the lands (probably more than one-half) which, under the policy then mapped out, were to have been occupied by Indian tribes and consolidated into one Territorial government, has been opened for settlement, and now comprises the Territory of Oklahoma. It is essential to bear in mind this policy of the Government, and the consent of the Five Civilized Tribes, as expressed in said treaties, for a thorough and correct understanding of many of the provisions found in those treaties.

In the report of the Committee on Indian Affairs, mentioned above, the Indian population is given as 58,331. The corrected census report for 1890, gives the Indian population at 50,055, and is given as follows:

Five Civilized Tribes, Indians living in the tribes	45,494
Other Indians including some Five Civilized Tribes Indians	4,561
Total Indians	50,055

But in addition to this 50,055 Indians there are large numbers of claimants to Indian citizenship who may or may not be Indians, within the provision of our treatise. These are put down as 18,636, and include the colored people whose rights of Indian citizenship are admitted as well as a large number who are not recognized by the Indian authorities as entitled to the rights of Indian citizenship, but who claim to be legally Indian citizens.

According to the census report, then, the population is as follows: Indians, 50,055; colored Indians, colored claimants to Indian citizenship, freedmen, and colored, wholly or in part, 18,636; Chinese, 13; whites, 109,393. Whites and colored on military reservation, 804; population of Quapaw Agency, 1,281, or a total of 180,182.

Since the taking of the census of 1890, there has been a large accession to the population of whites who make no claim to Indian citizenship, and who are residing in the Indian Territory with the approval of the Indian authorities. It is difficult to say what the number of this class is, but it can not be less than 250,000, and it is estimated by many well-informed men as much larger than that number, and as high as 300,000.

It is said that in and about McAlester there are about 5,000 white coal miners, and at Lehigh, about 6,000. In many sections the country is thickly settled with white farmers who farm the lands occupied by them under lease granted to them by individual Indians, or as the employés of Indians. To such an extent has this character of settlement and occupation gone, that in some agricultural sections the whites outnumber the Indians ten to one; this is especially true in the section occupied by the Chickasaws, who number only about 3,500, while the white population is variously estimated at from 50,000 to 70,000.

Flourishing towns have grown up along the lines of the railroads, composed wholly of white people. The town of Ardmore, in the Chickasaw country is said to contain 5,000 white people and not to exceed 25 Indians. Duncan and Purcell contain a population of from 1,000 to 1,500, composed of white people. The town of Muscogee, in the Creek country, contains a population of from 1,200 to 1,500 white people, and many other towns of from 500 to 1,500 people are known as "white towns." It is rare to see an Indian in any of these towns, except as they come in from their farms to dispose of their produce or purchase goods of the white trader.

Outside of the Cherokee country there are no laws for the organization of municipal governments for these growing towns, and no means by which the population of these towns can establish and maintain streets and sidewalks or organize and maintain a constabulary, such as has been found indispensable in urban communities.

The entire Indian Territory is well watered, with considerable forest and, in some sections, very excellent timber lands. Coal is found in nearly all parts of the Territory, and especially in the Choctaw and Chickasaw countries, and it is of an excellent character. The climate is good, the winters are mild, the soil productive, and the natural wealth very great. It is believed that the hilly country, sometimes called the mountain region, contains valuable minerals. It is certainly capable of maintaining a large population in independence and comfort.

This section of country was set apart to the Indian with the avowed purpose of maintaining an Indian community beyond and away from the influence of white people. We stipulated that they should have unrestricted self-government and full jurisdiction over persons and property within their respected limits, and that we would protect them against intrusion of white people, and that we would not incorporate them in a political organization without their consent. Every treaty, from 1828 to and including the treaty of 1866 was based on this idea of exclusion of the Indians from the whites and nonparticipation by the whites in their political and industrial affairs. We made it possible for the Indians of that section of country to maintain their tribal relations and their Indian polity, laws, and civilization if they wished so

to do. And, if now, the isolation and exclusiveness sought to be given to them by our solemn treaties is destroyed, and they are overrun by a population of strangers five times in number to their own, it is not the fault of the Government of the United States, but comes from their own acts in admitting whites to citizenship under their laws and by inviting white people to come within their jurisdiction, to become traders, farmers, and to follow professional pursuits.

It must be assumed in considering this question that the Indians themselves have determined to abandon the policy of exclusiveness, and to freely admit white people within the Indian Territory, for it can not be possible that they can intend to demand the removal of the white people either by the Government of the United States or their own. They must have realized that when their policy of maintaining an Indian community isolated from the whites was abandoned for a time, it was abandoned forever.

We did not hear from any Indian the suggestion that the white people there, with the consent of the Indian, should be removed.

We do not overlook the fact that there is a class of white people denominated by the Indians as intruders, who are not there with the approval of the Indians, but the number of this class is so small as compared with the white population not claiming rights of citizenship that they may not be considered in this connection. The United States was bound by its treaties to remove such whites as made an unauthorized settlement in the Indian Territory, and is now taking measures to remove from the Cherokee country a large band of such intruders. These intruders claim to be Indian citizens, and that they were invited by the Cherokee authorities to reside within the Territory, but the Cherokee authorities hold that they are not Cherokees. We believe there has been but little complaint in other sections of the Indian Territory of intruders.

The Indians of the Indian Territory maintain an Indian government, have legislative bodies and executive and judicial officers. All controversies between Indian citizens are disposed of in these local courts; controversies between white people and Indians can not be settled in these courts, but must be taken into the court of the Territory established by the United States. This court was established in accordance with the provision of the treaties with the Choctaws, Chickasaws, Creeks, and Seminoles, but no such provision seems to have been made in the treaty with the Cherokees. We think it must be admitted that there is just cause of complaint among the Indians as to the character of their own courts, and a good deal of dissatisfaction has been expressed as to the course of procedure and final determination of matters submitted to these courts. The determination of these courts are final, and, so far, the Government of the United States has not directly interfered with their determinations. Perhaps we should except the recent case where the Secretary of the Interior thought it his duty to intervene to prevent the execution of a number of Choctaw citizens.

As the Indian courts established within the limits of the Five Civilized Tribes had jurisdiction only of matters civil or criminal arising between members of the same tribe, it became necessary to provide courts with jurisdiction over criminal and civil matters arising between Indians of different tribes, and between white citizens and Indian citizens. Accordingly, by the act of January 31, 1877, the "country lying west of Missouri and Arkansas, known as the Indian Territory," was attached to the western district of Arkansas.

The Indian Territory at that time included what is now the territory of the Five Civilized Tribes, together with the territory now embraced within the limits of Oklahoma. Very few white people were then residents within the Indian Territory, but as the practice of the Indians to admit white citizens into their Territory increased, it was found that the jurisdiction conferred upon the U. S. court in the State of Arkansas did not meet the requirements of the situation.

Persons committing offenses within the Territory, not punishable in the Indian courts, were taken, in some instances, a distance of nearly 600 miles to the court at Fort Smith; and parties having civil controversies were not able to maintain their rights on account of the distance to be traveled and the expense entailed by proceedings in the Fort Smith court. So, by the act of January 6, 1883, that part of the Indian Territory lying north of the Canadian River and east of Texas and the one hundredth meridian not occupied by the Creek, Cherokee, and Seminole tribes, was annexed to and made part of the district of Kansas, and the U. S. district courts at Wichita and Fort Scott were given original and exclusive jurisdiction over all offenses committed within that territory against any of the laws of the United States. By the same act that part of the Indian Territory not annexed to the district of Kansas, and not set apart and occupied by Cherokee, Creek, Choctaw, Chickasaw, and Seminole tribes, was annexed to the northern district of Texas, and jurisdiction was given to that court over all offenses committed within the limits of the territory last named.

Prior to March 1, 1889, there was no court whatever in the Territory, except the Indian courts. But Congress, by act of that date, established a "U. S. court in the Indian Territory," extending over the entire Territory, including the present limits of Oklahoma and the Five Civilized Tribes, with exclusive jurisdiction over all offenses against the laws of the United States committed within the Indian Territory not punishable by death or imprisonment at hard labor, and jurisdiction in civil cases arising between citizens of the United States, residents of the Indian Territory, when the value of the thing in controversy or damages claimed amounted to not more than $100; and also jurisdiction over all controversies arising out of mining leases or contracts for mining coal made by the Indians. Two terms of said court were to be held each year at Muscogee, in the Indian Territory.

By section 17 of the same act the land embraced within the Chickasaw Nation and a portion of the Choctaw Nation, and all the part of the Indian Territory not theretofore annexed to the district of Kansas, was annexed to the eastern district of Texas. This left the land embraced within the Cherokee Nation and a portion of the Choctaw Nation attached to the western district of Kansas, and a portion of the Indian Territory lying north of the Canadian River attached to the judicial district of Kansas. Thus the U. S. courts at Paris, Tex., Fort Smith, Ark., and Fort Scott, Kans., retained jurisdiction, respectively, over all offenses punishable by death or imprisonment at hard labor arising within the Indian Territory, as then existing, except matters arising between Indians of the same tribe, which were still punishable only in the Indian courts.

By act of May 2, 1890, all that portion of the Indian Territory except that occupied by the Five Civilized Tribes and by the Indian tribes within the Quapaw Agency was included within the boundaries of the Territory of Oklahoma; but the Cherokee Outlet and the Public Land Strip and the Indian reservations included within said boundaries were not to become fully a part of said Territory until the proclamation of

the President should be made to that effect, and in case of the Cherokee Outlet and the Indian reservations not until the title of the Indians should be extinguished.

By the same act a new Indian Territory was created, consisting of all that portion of the Indian Territory as it had formerly existed not then included within the boundaries of the Territory of Oklahoma; and the same was divided into three divisions for the purpose of holding the terms of the court established at Muscogee by the act of March 1, 1889. The places for holding said court were fixed at Muscogee in the Creek country, at South MacAlester in the Choctaw country, and at Ardmore in the Chickasaw country. The jurisdiction of the country was further defined, and certain general laws of the State of Arkansas were made applicable to the Indian Territory, except as to causes, civil and criminal, in which members of the respective Indian tribes, by nativity or adoption, were the only parties.

The act of May 2, 1890, authorized the appointment of three commissioners within each of the divisions of the U. S. court in the Indian Territory, who, in addition to the powers of commissioners of the circuit court, should be ex-officio notaries public and have power to solemnize marriages, and were given the powers of justices of the peace of the State of Arkansas, but limited in their jurisdiction in civil suits to $100, with an appeal from their judgment.

It is estimated that at the present time there are between 250,000 and 300,000 white people, not citizens of the Indian nations by marriage or adoption, residing within the Indian Territory. They are not and can not be subject to the laws of the Indian nations, and can not obtain or enforce their rights in the Indian courts. These courts have no jurisdiction over them, either civil or criminal. All jurisdiction, therefore, over matters arising between white citizens in the Indian Territory and between white citizens and Indians, and between Indians of different tribes, is thus vested partly in the U. S. courts at Fort Smith, Ark.; Paris, Tex., and partly in the U. S. court established in the Indian Territory. This latter court has no jurisdiction of felonies, and no other court has final jurisdiction over misdemeanors, the powers of the commissioners in misdemeanors being merely those of an examining magistrate.

There is much conflict of jurisdiction in matters other than felonies between the U. S. courts and the courts at Fort Smith, Paris, and the Indian court within the Indian Territory. New statutes have been passed relating to offenses in the Indian Territory, and the statutes of Arkansas, which have been extended over the Territory, raise frequent and difficult questions of jurisdiction. The distances which parties are required to travel in cases where jurisdiction is claimed by the courts at Fort Smith and Paris are great, and the expense of deciding causes in those courts, by reason of the distance to be traveled and the time necessarily spent in their determination, is enormous. The court established for the Indian Territory, having cognizance of all minor offenses and of the smallest civil controversies, becomes the only court having police powers within the Territory, so that parties charged with the smallest misdemeanors are often taken over 200 miles to court for trial, and in civil controversies involving the smallest amounts may be compelled to resort to a court 200 or 300 miles distant. And this court is so burdened with business that prompt disposition of its cases, either criminal or civil, is utterly impossible. It is absolutely the only court of final jurisdiction administering justice in matters

large or small in a Territory as large as the State of Indiana, for a people numbering now at least 250,000 and rapidly increasing.

The conditions set forth result in a practical denial of justice in the Indian Territory, except in matters of paramount importance, and in these only after much delay. The criminal business of the Territory is transacted at enormous expense. Cases of the smallest importance, like ordinary assaults, often cost the Government from $200 to $500 each, by reason of the distance traveled by the deputy marshals in taking the prisoner charged to court and the fees of witnesses for travel and attendance. The temptation to arrest persons for trivial offenses under such conditions, where the deputy marshals receive such unusual fees, is very great, and complaint of the misuse of power in arrests and prosecutions is frequent. The expense of prosecuting crimes and maintaining courts in the Indian Territory amounts to about one-seventh of the judicial expense of the United States, and this not because crime is more prevalent in the Indian Territory than is usual in new and unsettled countries, but because of the system under which justice is supposed to be administered therein. Such glaring and unbearable evils can not be fully remedied until the question of political and judicial jurisdiction shall be finally changed and a Territorial or State government established.

A partial remedy, however, may in the opinion of the committee be applied at the present time. One judge can not dispose of the criminal and civil matters arising among 250,000 people with justice to the parties and reasonable dispatch of business. Moreover, misdemeanors and civil suits of limited amount should be disposed of mainly in the immediate locality where the offenses are committed or where the cause of action arises. The committee is of opinion that two additional judges for the court should be appointed, thus making one judge for each division, and that additional commissioners should be appointed by the court, and that such commissioners should have within their districts, to be limited and defined, final jurisdiction in misdemeanors where the punishment does not exceed a fine of $50 or imprisonment for six months, or both, with a right of appeal to the U. S. court in the Indian Territory, and should have final jurisdiction of civil suits arising within their respective jurisdictions where the value of the matter in controversy or damages claimed shall not exceed the sum of $300, with the right of appeal to said court; that the jurisdiction now conferred upon the U. S. district courts at Fort Smith and Paris should be taken away, and jurisdiction in all matters not punishable by said U. S. courts in Arkansas and Texas should be conferred upon the U. S. court in the Indian Territory.

The reason urged against this transfer of jurisdiction from the courts in Arkansas and Texas to the U. S. court in the Indian Territory no longer exists. It was first conferred because there was no court in the Indian Territory. It has been continued since the establishment of a court there because of the claim that it was impossible to secure proper juries to serve in the Indian Territory. However potent that reason may have been in the past, it can no longer be successfully maintained that jurors can not be found and are not found in the Indian Territory equally competent to try causes of the highest importance with those obtained in the adjoining States of Arkansas, Texas, and Kansas. The white people of the Indian Territory will compare favorably with the people of the adjoining States, and jurors selected from among such population may as safely be trusted to do justice. The change in the judicial system of the Territory thus out-

lined will, in the opinion of the committee, result in a great reduction of expense to the Government and a far better administration of justice than now exists. The present system is intolerable.

The Indians maintain schools for their own children. The Choctaws, Cherokees, and Creeks maintain schools for the children of recognized colored citizens, but the Chickasaws have denied to these freedmen not only the right of suffrage, especially provided for in the treaty of 1866, but have also denied to the children of freedmen the right to participate in their schools. We find in the Chickasaw country a freedmen population somewhat in excess of that of the Indian population, not only deprived of citizenship, but denied the privilege of schools, so that the children of that class are growing up in ignorance except in a few cases where schools have been maintained by individual means for the education of the freedmen children. This is in plain and open violation of the treaty of 1866.

The large white population of the Indian Territory are without the means of maintaining schools, except by means of rate bills. We believe there is nowhere else in the United States a population so large that has not the benefit of the truly American system of education—the public schools. No public schools are possible for this class of our citizens while the present condition of affairs continues in the Indian Territory.

It may be said that these people went to the Indian Territory with the knowledge that the education of their children would be left to their individual efforts, and therefore they ought not to complain. We do not stop to inquire whether the parents of these children complain or not—the nation at large has the right to protest against a condition that deprives the children of 200,000 or 300,000 white and several thousand colored people of the opportunity to acquire an education that will fit them for the discharge of the duties of citizenship, which they have the right to exercise in other parts of the country if they have not in the Indian Territory. It is not the concern of the parents alone, nor of the children alone, but of all the people of the United States, and it is a matter of concern to the citizens of those States contiguous to the Indian Territory. Common humanity demands that we take steps to secure to the people the advantages of education, even if they no not appreciate such advantages.

The theory of the Government was when it made title to the lands in the Indian Territory to the Indian tribes as bodies politic that the title was held for all of the Indians of such tribe. All were to be the equal participators in the benefits to be derived from such holding. But we find in practice such is not the case. A few enterprising citizens of the tribe, frequently not Indians by blood but by intermarriage, have in fact become the practical owners of the best and greatest part of these lands, while the title still remains in the tribe—theoretically for all, yet in fact the great body of the tribe derives no more benefit from their title than the neighbors in Kansas, Arkansas, or Missouri.

According to Indian law (doubtless the work of the most of the enterprising class we have named) an Indian citizen may appropriate any of the unoccupied public domain that he chooses to cultivate. In practice he does not cultivate it, but secures a white man to do so, who takes the land on lease of the Indian for one or more years according to the provision of the law of the tribe where taken. The white man breaks the ground, fences it, builds on it, and occupies it as the tenant of the Indian and pays rental either in part of the crop or in cash, as he may agree with his landlord.

Instances came to our notice of Indians who had as high as 100 tenants, and we heard of one case where it was said the Indian citizen, a citizen by marriage, had 400 holdings, amounting to about 20,000 acres of farm land. We believe that may be an exceptional case, but that individual Indians have large numbers of tenants on land not subdued and put into cultivation by the Indian, but by his white tenant, and that these holdings are not for the benefit of the whole people but of the few enterprising ones, is admitted by all. The monopoly is so great that in the most wealthy and progressive tribe your committee were told that 100 persons had appropriated fully one-half of the best land. This class of citizens take the very best agricultural lands and leave the poorer land to the less enterprising citizens, who in many instances farm only a few acres in the districts farthest removed from the railroads and the civilized centers.

As we have said, the title to these lands is held by the tribe in trust for the people. We have shown that this trust is not being properly executed, nor will it be if left to the Indians, and the question arises what is the duty of the Government of the United States with reference to this trust? While we have recognized these tribes as dependent nations, the Government has likewise recognized its guardianship over the Indians and its obligations to protect them in their property and personal rights.

In the treaty with the Cherokees, made in 1846, we stipulated that they should pass laws for equal protection, and for the security of life, liberty, and property. If the tribe fails to administer its trust properly by securing to all the people of the tribe equitable participation in the common property of the tribe, there appears to be no redress for the Indian so deprived of his rights, unless the Government does interfere to administer such trust.

Is it possible because the Government has lodged the title in the tribe in trust that it is without power to compel the execution of the trust in accordance with the plain provisions of the treaty concerning such trust? Whatever power Congress possessed over the Indians as semidependent nations, or as persons within its jurisdiction, it still possesses; notwithstanding the several treaties may have stipulated that the Government would not exercise such power, and therefore Congress may deal with this question as if there had been no legislation save that which provided for the execution of the patent to the tribes.

If the determination of the question whether the trust is or is not being properly executed is one for the courts and not for the legislative department of the Government then Congress can provide by law how such question shall be determined and how such trust shall be administered, if it is determined that it is not now being properly administered.

It is apparent to all who are conversant with the present condition in the Indian Territory that their system of government can not continue. It is not only non-American, but it is radically wrong, and a change is imperatively demanded in the interest of the Indian and whites alike, and such change can not be much longer delayed. The situation grows worse and will continue to grow worse. There can be no modification of the system. It can not be reformed. It must be abandoned and a better one substituted. That it will be difficult to do your committee freely admit, but because it is a difficult task is no reason why Congress should not at the earliest possible moment address itself to this question.

We do not care to at this time suggest what, in our judgment, will be the proper step for Congress to take on this matter, for the commis-

sion created by an act of Congress, and commonly known as the Dawes Commission, is now in the Indian Territory with the purpose of submitting to the several tribes of that Territory some proposition for the change in the present very unsatisfactory condition of that country. We prefer to wait and see whether this difficult and delicate subject may not be disposed of by an agreement with the several tribes of that Territory. But if the Indians decline to treat with that commission and decline to consider any change in the present condition of their titles and government the United States must, without their aid and without waiting for their approval, settle this question of the character and condition of their land tenures and establish a government over whites and Indians of that Territory in accordance with the principles of our constitution and laws.

As the matters submitted are so complicated and of such grave importance, the committee has thought proper to submit this preliminary report, and hopes, upon further investigation, to be able to make such further and more specific recommendation as to necessary legislation as will lead to a satisfactory solution of this difficult question.

S. Rep. 5——26

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 378.

IN THE SENATE OF THE UNITED STATES.

MAY 8, 1894.—Ordered to be printed.

Mr. SHOUP, from the Committee on Pensions, submitted the following

REPORT:

[To accompany S. 1833.]

The Committee on Pensions, to whom was referred the bill (S. 1833), granting a pension to Hannah Howard, have examined the same and the evidence on file in the case, and make the following report:

The claimant is the stepmother of Private Francis W. Howard, late of Company D, Sixty-fourth Regiment New York Volunteers. The records in the War Department show that the soldier was enrolled August 14, 1862, to serve three years, and was mustered into the service October 16, 1862, at Elmira, N. Y.; that he was a good soldier, and was killed in the battle of Gettysburg, July 2, 1863.

The claimant, as shown by competent evidence on file in the case, married George Howard, the soldier's father, on the 22d day of February, 1844, when Francis W. Howard, the above-named soldier, was about 4 years old. The claimant had the care and bringing up of said Francis W. Howard, and was a faithful and kind mother to him until he was killed, as above stated. The claimant's husband died on the 19th day of July, 1883, and left but a very small estate, less than $500 being realized. The claimant has never remarried and now, on account of being unable to support herself, being 72 years of age, and having no means, she is dependent upon her relatives and friends for her support.

Hiram B. Cooley, George H. Lee, and Solomon Shumway, neighbors of the claimant, each make affidavit verifying the above facts and stating further that they have known the claimant for from thirty to forty years.

After a thorough examination of the evidence on file in the case your committee believe that in justice and equity the claimant is entitled to a pension on account of the death of the soldier, as she gave him a mother's care from the time he was a very small child. Had the soldier been her own child she would have been entitled, under the general laws, to a pension.

Your committee are of the opinion that the case is an entirely meritorious one and therefore report it back favorably and recommend its passage, there being many precedents for the allowance of claims of this character by special act of Congress.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 379.

IN THE SENATE OF THE UNITED STATES.

MAY 8, 1894.—Ordered to be printed.

Mr. GORMAN, from the Committee on Printing, submitted the following

REPORT:

[To accompany House concurrent resolution providing for the printing of 11,000 copies of a special report of the Bureau of Statistics of the Treasury Department on the imports for consumption and domestic exports for the years 1884 to 1894, 2,000 for the Senate, 4,000 for the House, and 5,000 for distribution by the Bureau of Statistics of the Treasury Department.]

The Committee on Printing, to whom was referred the accompanying resolution, having considered the same, report it back with the recommendation that it do not pass, and that in lieu thereof the following substitute do pass:

PROPOSED SUBSTITUTE.

Resolved by the Senate (the House of Representatives concurring), That there be printed for the use of Congress 6,000 additional copies of Senate Report No. 259 of the present session, parts 1 and 2, in 1 volume, bound in cloth, being a compilation of statistics on imports for consumption and domestic exports from 1867 to 1893, inclusive, of which number 2,000 copies shall be for the use of the Senate and 4,000 for the use of the House of Representatives.

The committee found on examination that Senate Report No. 259, which is proposed to be printed in additional numbers instead of the special report referred to in the House resolution, embraced the same data covered by the special report proposed to be printed, in entirely reliable and accurate form, and also covered a longer period in the commercial history of the country, and was therefore a more valuable document. But as the Senate report is already in print there will be no cost for composition in producing the additional copies proposed, and for this reason, although the Senate report is the more comprehensive and valuable document, the additional numbers proposed will cost several thousand dollars less than the document proposed to be printed by the House resolution.

The cost of the substitute resolution, as estimated by the Public Printer, will be $3,372.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 380.

IN THE SENATE OF THE UNITED STATES.

MAY 8, 1894.—Ordered to be printed.

Mr. GORMAN, from the Committee on Printing, submitted the following

REPORT:

[To accompany Senate concurrent resolution to print 8,000 copies of the eulogies delivered in Congress upon the Hon. Randall Lee Gibson, late a Senator from the State of Louisiana, 2,000 for Senators and Representatives from that State, 2,000 for the Senate, 4,000 for the House of Representatives, 50 of the quota of the Senate to be bound in full morocco, with gilt edges, for the family of deceased.]

The Committee on Printing, to whom was referred the accompanying resolution, having considered the same, report it back with an amendment, and as amended recommend its passage.

AMENDMENT PROPOSED.

In line 12 strike out the word "Senate" and insert in lieu thereof the words "Senators and Representatives from the State of Louisiana."

The proposed amendment takes the 50 copies to be bound in full morocco for the family from the number specially allotted to Senators and Representatives from Louisiana, instead of from the quota of the Senate, and thus makes the resolution conform to the previous practice in regard to printing and distributing eulogies.

The Public Printer estimates the cost at $3,000.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 381.

IN THE SENATE OF THE UNITED STATES.

MAY 9, 1894.—Ordered to be printed.

Mr. MITCHELL, of Oregon, from the Committee on the Judiciary, submitted the following

REPORT:

[To accompany H. R. 5860.]

The Committee on the Judiciary, to whom was referred the bill (H. R. 5860) entitled "An act to amend sections four, six, and ten of the act of February ninth, eighteen hundred and ninety-three, entitled 'An act to establish a court of appeals for the District of Columbia, and for other purposes,'" having had the same under consideration beg leave to report the same back with the following amendments:

First amendment. In line 34, page 2, strike out the following words: "Clerical assistance and."

Second amendment. In lines 36 and 37, on page 2, strike out the following words: "Two thousand," and insert in lieu thereof the following words: "Five hundred."

And with these amendments your committee recommend the passage of the bill.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 382.

IN THE SENATE OF THE UNITED STATES.

MAY 9, 1894.—Ordered to be printed.

Mr. PALMER, from the Committee on Pensions, submitted the following

REPORT:

[To accompany S. 237.]

The Committee on Pensions, to which was referred the bill (S. 237) granting a pension to Mrs. Ann Bradford, widow of Daniel R. Bradford and mother of William K. Bradford, late of Company B, Seventy-sixth Missouri Enrolled Militia Volunteers, having considered and carefully examined the same, find that her husband, Daniel R. Bradford, fought in the war of 1812, and that her son, George W. Bradford, was killed in battle during the Mexican war, and that her second son, William K. Bradford, who was a member of Company B, Seventy-sixth Missouri Enrolled Militia Volunteers, was killed in the battle on the 5th of July, 1864, at Melville, Mo.; that said William K. Bradford died, leaving neither widow or child surviving; that Ann Bradford, the mother, made application under claim No. 486292, which was rejected by the Bureau of Pensions on the ground that the Seventy-sixth Missouri Militia was a State organization.

Your committee further find that she is in her ninety-fourth year, and by the affidavit and petition submitted herewith that she is old and infirm and requires the constant attendance of someone to look after her; that she is not possessed of any property, either personal or otherwise, but is wholly dependent on her daughters, who are not legally bound for her support. Under the circumstances, believing this to be a meritorious case, we recommend the passage of the bill with two amendments, as follows:

First, strike out in lines 4 and 5 the words "subject to the provisions and limitations of the pension laws," and, second, add at the end of line 8 the following: "and to pay her a pension at the rate of $25 per month."

STATE OF MISSOURI, *County of Jasper, ss:*

We live near neighbors to Ann Bradford, who resides with her widowed daughters, and know from personal knowledge that she is not possessed of any property, either personal or mixed, but is wholly dependent upon her daughters, who are not legally bound for her sup-

port. We do not know her age, but judge from her appearance and actions that she is as old as she claims to be, about 90 years. She is so old and infirm that she requires the constant attention of some one to look after her. We have been acquainted with the family for eighteen years.

CHAUNCEY B. STICKNEY.
THOS. M. GARLAND.

Subscribed and sworn to before me April 13, 1892, at Carthage, Mo.
[SEAL.] GEO. P. CUNNINGHAM,
Notory Public.
Commission expires July 12, 1895.

To the honorable the Senate and the House of Representatives of the United States of America in Congress assembled:

Your petitioners, as below, whose post-office addresses are Carthage, in the county of Jasper and State of Missouri, respectfully represent that they are neighbors, friends, and acquaintances of Mrs. Ann Bradford, of Carthage, Mo.; that she is now 94 years of age, in dependent circumstances, in fact, entirely dependent on others not legally bound to support her. We are credibly informed and verily believe that her husband, who has been dead for many years, was a privateersman in the war of 1812; further, that she had a son in the military service of the United States who was killed in the war with Mexico; further, that she had another son, William K. Bradford, who was a member of Company B, Seventy-sixth Missouri Enrolled Militia Volunteers; this son was killed while in this service on the 5th July, 1864, at Melville, Mo., by the enemies of the Union. This latter son died leaving neither widow nor child surviving. We are satisfied that the mother has made a claim for pension, No. 486292, which has been rejected on the ground that the Seventy-sixth Missouri was a State organization.

We are told that this old lady is not entitled to pension for the services of her husband in 1812, nor for the services and death of her son in Mexico, nor can she obtain a pension for the death of her son killed in action in the late war. Believing the circumstances as stated warrant and should entitle her to relief, we pray the passage of Senate bill No. 2710; and thus, as in duty bound, your humble petitioners will ever humbly pray.

GEO. P. CUNNINGHAM.
B. R. A. JONES.
GEO. W. BAKER.
G. W. ROBB.
DAVID MILLER.
WILSON WILLIAMS.
A. FULTZ.
G. SHEFFIELD.
ANDREW J. LAMB.
T. H. STEWART.
A. M. DOUGLAS.
JONATHAN LAYMAN.
WILL S. SEVIER.
HENRY PENSINGO.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 383.

IN THE SENATE OF THE UNITED STATES.

MAY 9, 1894.—Ordered to be printed.

Mr. GORMAN, from the Committee on Printing, submitted the following

REPORT:

[To accompany Senate concurrent resolution to print 40,000 additional copies of the Ninth Annual Report of the Commissioner of Labor, relating to building and loan associations, to be bound in cloth; 8,000 for the Senate, 16,000 for the House of Representatives, and 16,000 for distribution by the Department of Labor.]

The Committee on Printing having considered the accompanying resolution report it to the Senate and recommend that it pass.

The Public Printer estimates the cost at $13,812.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 384.

IN THE SENATE OF THE UNITED STATES.

MAY 9, 1894.—Ordered to be printed.

Mr. MCPHERSON, from the Committee on Naval Affairs, submitted the following

REPORT:

[To accompany H. R. 6321.]

The Committee on Naval Affairs, to whom was referred the bill (H. R. 6321) authorizing certain officers of the Navy to administer oaths, having carefully considered the same, recommend that the bill do pass with the following amendment:

In line 6, after the word "Navy," insert "and the adjutant and inspector, commanding officers, and recruiting officers of the Marine Corps."

Amend title by inserting after the word "Navy" the words "and Marine Corps."

The committee submit the following letter of the Secretary of the Navy in regard to the proposed amendment and adopt the House report:

NAVY DEPARTMENT,
Washington, May 5, 1894.

SIR: Referring to the Department's communication of the 15th of March last, transmitting a draft of a bill entitled "A bill authorizing certain officers of the Navy to administer oaths," which was, under date of March 19, 1894, introduced in the Senate by Senator Smith (S. 1779), and referring also to H. R. 6321, which was passed by the House on the 2d instant and which was a duplicate of the Senate bill above referred to, I have the honor to recommend that, in accordance with the request of the colonel commandant of the U. S. Marine Corps, said bill be so amended as to include the adjutant and inspector, commanding officers, and recruiting officers of the Marine Corps.

Very respectfully,

W. MCADOO,
Acting Secretary of the Navy.

Hon. JOHN R. MCPHERSON,
Chairman Committee on Naval Affairs, U. S. Senate.

The Committee on Naval Affairs, to whom was referred the bill (H. R. 6321) authorizing certain officers of the Navy to administer oaths, respectfully report as follows:

This is a bill to authorize judge-advocates of naval courts-martial and courts of inquiry, and all commanders in chief of naval squadrons, commandants of navy-yards and stations, and officers commanding vessels of the Navy to administer oaths for the purposes of the administration of naval justice, and for other purposes of naval administration.

In the administration of the affairs of the Navy Department it frequently becomes necessary to propound certain questions to officers which are to be answered under oath, and it often happens that the ships upon which these officers are stationed are at such a distance from any place where there is an officer empowered to administer oaths that the interests of justice are much delayed.

Furthermore, in the examination of officers for promotion and retirement interrogatories are sent to other officers to be answered under oath, and as these amount to quite a number every year, and as the fees allowed to notaries public and others for administering oaths vary in the different States, many of them being very large, a considerable expenditure of money is necessary for this purpose.

For these reasons it is believed that both in the interest of economy and convenience the passage of the bill will be of material advantage to the service.

For the above reasons the honorable the Secretary of the Navy advocates the passage of this bill, and your committee report it back favorably and recommend that it do pass.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 385.

IN THE SENATE OF THE UNITED STATES.

MAY 10, 1894.—Ordered to be printed.

Mr. MANDERSON, from the Committee on Military Affairs, submitted the following

REPORT:

[To accompany S. R. 68.]

The Committee on Military Affairs, to whom was referred the joint resolution (S. R. 68) entitled "joint resolution for the relief of W. D. Mack, a clerk in the Record and Pension Office of the War Department," having had the same under consideration, report it back favorably and recommend its passage.

The following statement of the acting chief of the Record and Pension Office of the War Department gives fully the circumstances attending the accident to Mr. Mack, and sets forth the reasons for the relief desired, and the recommendation of the Department:

Case of William D. Mack, clerk, Record and Pension Office, War Department.

RECORD AND PENSION OFFICE,
War Department, March 12, 1894.

As shown by the records, William D. Mack entered the service as a volunteer soldier in May, 1861, to serve three years, and, after serving with his command (the Second Michigan Infantry) for more than two years in the field, was detailed for clerical duty in the office of the Adjutant-General of the Army. He has a record of more than twenty years' service to the Government, the last fourteen of which have been continuous. He is now rendering acceptable service as a clerk of class two in this office.

On the 4th of July last, while returning from a soldiers' reunion at Gettysburg, Pa., Mr. Mack was accidentally thrown under a moving railway train, and so seriously injured as to necessitate the amputation of both feet. By reason of this injury he was absent from duty until October 15, 1893, his total absence for the calendar year being thirty-three and one-half days in excess of the time, from all causes, allowed, with pay, by the act of March 3, 1893, making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year ending June 30, 1894.

Mr. Mack is a man of correct personal habits, a faithful and efficient clerk, and is entirely worthy of the most favorable consideration. His case is one of peculiar hardship and evidently one not contemplated by the act limiting the heads of Departments in the time for which leave of absence may be granted without loss of pay. The enactment of the bill for his relief, it is believed, would be no more than just, considering his long and faithful service and the peculiar circumstances surrounding the case.

Respectfully submitted.

J. FRECH,
Chief of Division, in the absence of Col. Ainsworth.

The SECRETARY OF WAR.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 386.

IN THE SENATE OF THE UNITED STATES.

MAY 10, 1894.—Ordered to be printed.

Mr. PASCO, from the Committee on Military Affairs, submitted the following

ADVERSE REPORT:

[To accompany S. 1077.]

The Committee on Military Affairs, to whom was referred the bill (S. 1077) for the relief of Henry Smith from the charge of desertion, have carefully considered the same and submit the following report thereon:

Henry Smith enlisted in Company A, Fifth Regiment Ohio Cavalry Volunteers, February 18, 1865, for one year. According to his petition to the two Houses of Congress and his accompanying affidavit, he left his regiment at Morganton, N. C., about the 1st of September, 1865, without leave, to buy whisky for himself and some comrades. After purchasing the whisky he became intoxicated and remained in that condition for some time, and when he became sober he found that his regiment had left Morganton. He seems to have made no attempt to find his command, and the reason for not following it given in his affidavit is that "not thinking of any future advantage a discharge might be to him," he went to Morristown, Tenn., "where he found employment and went to work."

He does not seem to have realized the position this action placed him in till some time after, when he applied for a pension and was informed that he was marked on the rolls as a deserter. His military history shows that he has made several efforts at the War Department for relief, and several sworn statements have been there filed by him at different dates, which do not altogether agree with that before the committee. None of them put the case in a better light, and his statements are not supported by corroborating testimony. During his brief service he seems to have been in arrest for two months at Raleigh, N. C., but the cause is not stated. The Department, after considering his case, has several times denied his application for relief on the ground that his case lacked merit, for by his own statement "he was not prevented from completing his term of enlistment by wounds, injuries, or disease received or contracted in the line of duty."

The committee see no reason for reviewing this action, and recommend that the bill be indefinitely postponed.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 387.

IN THE SENATE OF THE UNITED STATES.

MAY 10, 1894.—Ordered to be printed.

Mr. PROCTOR, from the Committee on Organization, Conduct, and Expenditures of the Executive Departments, submitted the following

REPORT:

[To accompany H. R. 6948.]

The Committee on Organization, Conduct, and Expenditures of the Executive Departments, having considered House bill No. 6948, recommend its passage.

The provisions of the bill have been thoroughly and sufficiently discussed and presented in the report of the Joint Commission to Inquire into the Status of Laws Organizing Executive Departments and in the report of the experts employed by the commission, both of which are submitted herewith and made a part of this report.

The committee also submit herewith an extract from a letter of the Secretary of the Treasury, not printed in the report of the commission:

TREASURY DEPARTMENT, OFFICE OF THE SECRETARY,
Washington, D. C., April 24, 1894.

* * * * * * *

With reference to objections which have been raised in Senate Mis. Doc. No. 145 to the bill to improve the methods of accounting in the Department of the Treasury, introduced by you from the joint commission of Congress, I beg to add that I have carefully examined the same and find no reasons therein to change the views expressed by me in the letter of March 27 last, addressed to you, concerning the bill in question.

In my judgment the provisions of the bill will accomplish a prompt and accurate audit of the expenditures of the Government more nearly contemporaneous with their creation than can be secured under the existing system.

About 90 per cent of all the expenditures of the Government other than those from postal revenues are made through responsible disbursing agents, and their accounts will be carefully audited by the administrative departments of the Government before going to the Auditors. This method, together with the requirement that all claims which do not receive an administrative audit shall have two independent examinations in the Auditor's offices, constitutes a complete check, and besides the proposed bill provides the additional safeguard of an active legal supervision on the part of the Comptroller.

The delays under the present accounting system have long been the subject of adverse comment and criticism, both in Congress and in the Department. My immediate predecessor, Hon. Charles Foster, in his last annual report to Congress said, among other things, with reference to this subject:

"It is not only vexatious in respect to details, but wrong in respect to system. Beyond that, however, is the fact that it is highly expensive, without compensating results to the Government."

I have personally, and with the aid of officials of the Treasury Department, given careful consideration to the provisions of the bill, and I again earnestly recommend that it be enacted.

Respectfully, yours,

J. G. CARLISLE,
Secretary.

Hon. A. M. DOCKERY,
House of Representatives.

The committee also submit a letter from Hon. Charles Foster, late Secretary of the Treasury:

DEAR SIR: As requested by you, I have very carefully examined the provisions of the bill, H. R. 6948, improving the methods of accounting in the Treasury. I believe the bill will secure the speedy and reliable audit of the expenditures of the Government, infinitely superior to the present system.

Very truly, yours,

CHARLES FOSTER.

Hon. A. M. DOCKERY,
Chairman, Joint Commission of Congress.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 388.

IN THE SENATE OF THE UNITED STATES.

MAY 10, 1894.—Ordered to be printed.

Mr. GORMAN, from the Committee on Printing, submitted the following

REPORT:

[To accompany Senate resolution to authorize the joint subcommittees of the Committees on Naval Affairs of the two Houses on the Personnel of the Navy to have printed, together with their report thereon, in the usual number, so much as they may deem necessary of the evidence taken and other information obtained by them or through the Navy Department in relation to the personnel of the Navy, not to exceed 1,200 octavo pages.]

The Committee on Printing, to whom was referred the accompanying resolution, having considered the same, report it back without amendment and recommend its adoption.

The Public Printer estimates the cost of printing 1,200 octavo pages at $2,904.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 389.

IN THE SENATE OF THE UNITED STATES.

MAY 10, 1894.—Ordered to be printed.

Mr. MITCHELL, of Oregon, from the Committee on Claims, submitted the following

REPORT:

[To accompany S. 763.]

The Committee on Claims, to whom was referred the bill (S. 763) "relieving the personal representatives of John Sherman, jr., late U. S. marshal for the Territory of New Mexico, from the requirements of section 833 of the Revised Statutes," having had the same under consideration, submit the following report:

John Sherman, jr., was U. S. marshal for the Territory of New Mexico for several years, commencing about ——— A. D. ——, and continuing until April 21, 1882. It seems his accounts were duly audited by the accounting officers of the Treasury Department in 1889, and a balance of $371 found to be due him on account of the appropriation for fees and expenses of marshals of U. S. courts, 1882, as per report of the First Auditor of the Treasury, No. 117800. There being no money with which to pay this claim it was duly reported to Congress as a deficiency and an appropriation covering the amount was made by the Fifty-first Congress, second session, and which appropriation is now available. It appears, however, from the following letter from the First Comptroller of the Treasury that Mr. Sherman had failed to render his emolument returns for the periods from July 1 to December 31, 1881, and from January 1 to April 21, 1882, as required by the provisions of section 833 of the Revised Statutes.

TREASURY DEPARTMENT, FIRST COMPTROLLER'S OFFICE,
Washington, D. C., March 25, 1892.

DEAR SIR: In reply to your letter of inquiry of the 22d instant, inclosing a copy of Senate bill No. 1077, for the "relief of the personal representatives of John Sherman, jr., deceased, late U. S. marshal for the Territory of New Mexico," etc., I would state that the only account which would be affected by the passage of the said bill would be a claim in favor of the late marshal, which was duly audited and allowed by this office in the sum of $371, on account of the appropriation for "fees and expenses of marshals, U. S. courts, 1882," per report of the First Auditor of the Treasury, No. 117800.

There being no money with which to pay the said claim, it was duly reported to Congress for a deficiency appropriation, and the late marshal notified of his failure to render his emolument returns for the periods from July 1 to December 31, 1881, and from January 1 to April 1, 1882, as required by the provisions of section 833, Revised Statutes.

A deficiency appropriation covering the amount of the said claim was made by the Fifty-first Congress, second session, in House Ex. Doc. No. 171, and which appropriation is now available, but as the emolument returns for the periods mentioned have never been rendered as required by law, this office, acting under the provisions of

section 1766, Revised Statutes, has felt bound to refuse to certify the said claim for payment.

In conclusion I would state that should your committee desire any further information in the matter, this office will be glad to furnish whatever may be in its possession.

The copy of the bill is herewith returned.

Respectfully, yours,

A. C. MATTHEWS,
Comptroller.

Hon. J. H. MITCHELL,
Chairman Committee on Claims, U. S. Senate.

A similar bill passed the Senate at the last Congress, reported favorably from House committee, January 18, 1893. Passed the House a few seconds before the final adjournment of the Fifty-second Congress, too late to be enrolled for the signature of the President, as shown from the following record of House proceedings:

PERSONAL REPRESENTATIVES OF JOHN SHERMAN.

Mr. REYBURN. I move to suspend the rules and pass the bill (S. 1077) relieving the personal representatives of John Sherman, jr., late United States marshal for the Territory of New Mexico, from the requirements of section 833 of the Revised Statutes.

The bill was read, as follows:

"*Be it enacted, etc.*, That the personal representatives of the late John Sherman, jr., late United States marshal for the Territory of New Mexico, be, and they are hereby, relieved from the rendition of his emolument returns for the periods from July 1 to December 31, 1881, and from January 1 to April 21, 1882, as required by section 833 of the Revised Statutes."

The motion to suspend the rules and pass the bill was agreed to, two-thirds voting in favor thereof.

The SPEAKER. The hour of 12 o'clock having arrived, the chair declares the House of Representatives of the Fifty-second Congress adjourned without day.

In view of the foregoing your committee report back bill S. 763, without amendment, and recommend its passage.

O

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 390.

IN THE SENATE OF THE UNITED STATES.

MAY 11, 1894—Ordered to be printed.

Mr. COCKRELL, from the Committee on Military Affairs, submitted the following

REPORT:

[To accompany S. 1294.]

The Committee on Military Affairs, to which was referred the bill (S. 1294) to remove the charge of desertion from the record of Benjamin Hartley, have duly considered the same and submit the following report:

This bill directs the Secretary of War to remove the charge of desertion from the military record of Benjamin Hartley, late a member of Company C, Thirty-third Ohio Volunteer Infantry, and Eighteenth U. S. Infantry.

In the Fifty-first Congress a precisely similar bill (S. 3642) was referred to this committee and reported adversely by Senate report 2594, as follows:

The Committee on Military Affairs, to which was referred the bill (S. 3642) to remove the charge of desertion from the record of Benjamin Hartley, have duly considered the same and submit the following report:

Accompanying this bill there was presented to your committee a petition, dated March 14, 1888, and verified by affidavit of the claimant on the same day, signing by his mark, in which the claimant states that he enlisted in Company C, Twenty-second Ohio Volunteers, April 22, 1861, for three months; was discharged August 19, 1861, and was again enlisted as a private in Company C, Thirty-third Ohio Volunteer Infantry for three years or during the war, and was mustered into the service August 27, 1861, and on the 16th of October, 1862, was captured near Crab Orchard, Ky.; was paroled and sent to Columbus, Ohio, and placed in Company F, Fifth Parole, under Col. Boone; and on December 5, 1862, was transferred to Company D, Second Battalion, Eighteenth U. S. Infantry, by order of the War Department; and that he served faithfully, and while at Graysville, Ga., in March, 1864, he was given the privilege as a volunteer to veteranize, which he did, it being his understanding that he was reenlisting for three years, or during the war, unless sooner discharged; that he received a veteran furlough, went home, and returned to his regiment at Graysville two days before the expiration of his furlough; served until July 2, 1865, at Lookout Mountain, Tenn., when, believing that his whole duty was done, he quit and returned home. He claims that he was placed in the regular service by order of the War Department and had no choice in the matter, but acquiesced, and performed his duty until the war was over, when his presence was needed more at home than at the front. He left his command and returned home, and now prays that the charge of desertion against him be removed.

Your committee referred the bill to the Secretary of War for information and report and received in reply the following letter and accompanying report:

WAR DEPARTMENT,
Washington, May 1, 1890.

SIR: I return herewith S. 3642, "to remove the charge of desertion from the record of Benjamin Hartley," referred to this Department on the 26th ultimo, and invite your attention to the inclosed report of the Adjutant-General's Office, dated the 30th ultimo, on the bill.

Very respectfully,

REDFIELD PROCTOR,
Secretary of War.

Hon. J. R. HAWLEY,
Chairman Committee on Military Affairs, U. S. Senate.

WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE,
Washington, April 30, 1890.

The SECRETARY OF WAR:

SIR: I have the honor to return herewith bill (S. 3642) for the removal of the charge of desertion from the record of Benjamin Hartley, late Company C, Third Ohio Volunteers, Eighteenth United States Infantry, and in compliance with the request of the Committee on Military Affairs, United States Senate, to report that Benjamin Hartley, after discharge from the Third Ohio Volunteers, enlisted December 15, 1862, in Company D, Second Battalion, Eighteenth Infantry; was discharged from this organization February 21, 1864, by reason of reenlistment; reenlisted in Company D, Second Battalion, Eighteenth Infantry, February 21, 1864, for 3 years; deserted July 6, 1865, and never returned to the service.

His case is not covered by the provisions of the act of March 2, 1889, the only law on the subject of removal of charge of desertion now in force, and in justice to other soldiers of the regular Army, whose status is the same as that of this man, I can not recommend favorable action in this individual case.

Very respectfully,

C. MCKEEVER,
Acting Adjutant-General.

Not being satisfied with the information contained in said letter and report, your committee again referred the letter to the War Department, and received in reply the following communication:

WAR DEPARTMENT,
Washington City, May 10, 1890.

Hon. F. M. COCKRELL, *U. S. Senate.*

SIR: Referring to your request of the 7th instant for certain information additional to that contained in report from this Department of the 1st instant upon Senate bill No. 3642, Fifty-first Congress, first session, entitled "A bill to remove the charge of desertion from the record of Benjamin Hartley," late a member of Company C, Thirty-third Ohio Volunteer Infantry, and Eighteenth U. S. Infantry, I am directed by the Secretary of War to inform you that the official records show that Benjamin Hartley was enrolled April 20, 1861, to serve three months, in Company C, Twenty-second Ohio Volunteers, and served therein until August 19, 1861, when he was mustered out with company; that he enlisted August 27, 1861, for three years in Company C, Thirty-third Ohio Volunteers, and served faithfully until October —, 1862, when he was captured by the enemy, paroled, and sent to Columbus, Ohio (exact date of capture and parole is not shown by records); that on December 15, 1862, he enlisted at Columbus, Ohio, in the regular Army to serve three years under General Orders, No. 154, War Department, Adjutant-General's Office, dated October 9, 1862 (copy herewith), and was assigned to Company D, Second Battalion, Eighteenth U. S. Infantry; that he was discharged February 21, 1864, at Chattanooga, Tenn., by reason of reenlistment; that he reenlisted in the same company on the same date, and served therein until July 6, 1865, when he is reported as having deserted at Lookout Mountain, Tenn. He never returned.

No testimony bearing upon the case of this soldier is on file in this Department, the only application for removal of the charge of desertion by him having been returned to his attorneys by indorsements to the effect that no action will be taken upon his case until he shall have surrendered to the military authorities, and that his case is not embraced within the provisions of the act of Congress approved March 2, 1889.

The petition of Mr. Hartley is herewith returned.

Very respectfully,

F. C. AINSWORTH,
Captain and Assistant Surgeon, U. S. Army.

The General Order No. 154, War Department, Adjutant-General's Office, referred to in the foregoing letter, is as follows:

General Orders, No. 154.

WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE,
Washington, October 9, 1862.

The commanding officer of each regiment, battalion, and battery of the regular Army in the field, will appoint one or more recruiting officers, who are hereby authorized to enlist, with their own consent, the requisite number of efficient volunteers to fill the ranks of their command to the legal standard.

The enlistments will be made in the usual mode, and for three years, or for the remaining portion of the period of three years which the volunteer has yet to serve, if he so prefer.

The recruiting officers will furnish to the commanding officers of companies to which volunteers whom they may enlist belong, lists of such volunteers, exhibiting the dates of enlistment of each in the regular service. All the men upon such lists will be reported as honorably discharged the day previous to the date of their enlistment, on the first subsequent muster roll of their company.

As an inducement to volunteers to enlist in the regular Army, it will be remembered that promotion to commissions therein is open by law to its meritorious and distinguished noncommissioned officers, and that many have already been promoted.

By order of the Secretary of War.

L. THOMAS,
Adjutant-General.

Under this general order this claimant, on December 15, 1862, enlisted in the regular Army to serve three years, and was assigned to Company D, Second Battalion, U. S. Infantry, and on February 21, 1864, at Chattanooga, Tenn., was discharged by reason of reenlistment, and was reenlisted in the same company on the same day, and served therein until July 6, 1865, when he deserted at Lookout Mountain, Tenn. His reenlistment, February 21, 1864, was for three years. This service was not during the war as a volunteer service, and the claimant must have known the kind of command he was in, and that they were continued in the service regardless of the continuance or the end of the war.

There is no evidence whatever to sustain the claim of Mr. Hartley. He undertook to decide for himself, alone, the character of his contract with the Government and the duty he owed, regardless of the claims of the Government and regardless of the plain terms of the contract of enlistment. He deliberately quit the service, returned to his home, and must now take the consequences of his own voluntary act. The War Department refused to remove the charge of desertion, and very properly, and there is no ground upon which your committee can favorably consider this application.

Your committee therefore report the bill back to the Senate adversely, and recommend that the bill be indefinitely postponed and the relief prayed for in the bill be not granted.

This report shows all the facts. There is no charge of desertion standing against him as a member of either the Twenty-second or Thirty-third Ohio Volunteer Infantry. The charge of desertion is on his record in the Eighteenth U. S. Infantry. Since the presentation of the foregoing adverse report, no new facts have been presented, nor does it seem possible for Mr. Hartley with any consistency with his own statements and affidavits to present any such facts or statements as would entitle him to the relief he asks.

Your committee again report the bill back to the Senate adversely and recommend its indefinite postponement.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 391.

IN THE SENATE OF THE UNITED STATES.

MAY 11, 1894.—Ordered to be printed.

Mr. COCKRELL, from the Committee on Military Affairs, submitted the following

ADVERSE REPORT:

[To accompany S. R. 45.]

The Committee on Military Affairs, to which was referred the joint resolution (S. R. 45) granting a medal to Bvt. First Lieut. A. Liebschutz, have duly considered the same and submit the following report:

This resolution recites that A. Liebschutz, a private of Company K, Ninth Regiment Kansas Cavalry, was brevetted lieutenant for meritorious services and for wounds received at the battle of Prairie Grove, Ark., to take effect March 13, 1865, and then directs the Secretary of War to issue to him a medal in recognition of his services. The following is his military record:

Case of A. Liebschutz, late of Ninth Kansas Cavalry.

RECORD AND PENSION OFFICE,
War Department, July 30, 1892.

The records show that Adolph Liebschutz was originally enrolled April 22, 1861, at St. Louis, Mo., as a private in Company C, Second Missouri Volunteers, and was mustered out of service with the company August 31, 1861. He was again enrolled at Marysville, Kans., July 11, 1862, under the name Francis A. *Liebshutz*, as a private in Company K, Ninth Kansas Cavalry, to serve three years, and was discharged at Paola, Kans., May 1, 1863, on account of wounds received at Prairie Grove, Arkansas.

An act of Congress approved March 3, 1863, authorized the Secretary of War to issue medals of honor to officers, noncommissioned officers, and privates who rendered distinguished services in the late war. No application for the issue of a medal under this law appears to have been received in case of this soldier.

Respectfully submitted.

F. C. AINSWORTH,
Colonel, U. S. Army, Chief Record and Pension Office.

The SECRETARY OF WAR.

Mr. Liebschutz was brevetted first lieutenant for meritorious services and for wounds received at the battle of Prairie Grove, Arkansas, to date March 13, 1865, but his brevet appointment was not made by the President and confirmed by the Senate until March 13, 1867.

This was a high compliment and honor.

On July 12, 1862, the following resolution was enacted into law, to wit:

[No. 52.] A RESOLUTION to provide for the presentation of "medals of honor" to the enlisted men of the Army and volunteer forces who have distinguished or may distinguish themselves in battle during the present rebellion.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the President of the United States be, and he is hereby, authorized to cause two thousand "medals of honor" to be prepared with suitable emblematic devices, and to direct that the same be presented, in the name of Con-

gress, to such noncommissioned officers and privates as shall most distinguish themselves by their gallantry in action, and other soldier-like qualities, during the present insurrection. And that the sum of ten thousand dollars be, and the same is hereby, appropriated, out of any money in the Treasury not otherwise appropriated, for the purpose of carrying this resolution into effect.

Approved, July 12, 1862.

In the law of March 3, 1863, known as the sundry civil appropriation law, is the following provision, to wit:

SEC. 6. *And be it further enacted*, That the President cause to be struck, from the dies recently prepared at the United States Mint for that purpose, "medals of honor," additional to those authorized by the act [resolution] of July twelfth, eighteen hundred and sixty-two, and present the same to such officers, noncommissioned officers, and privates as have most distinguished or who may hereafter most distinguish themselves in action; and the sum of twenty thousand dollars is hereby appropriated, out of any money in the Treasury not otherwise appropriated, to defray the expenses of the same.

These laws now in full force give ample power to the President, the head of the executive branch of our Government, to do equal and exact justice to all deserving officers and soldiers. The War Department, with all its records, is under his charge, with all necessary facilities for ascertaining all available data in regard to the record and services of officers and soldiers.

The Congress of the United States is not the proper tribunal for the investigation of the individual records and services of the many officers and soldiers in the late war, to ascertain now, after a lapse of thirty years, whether this soldier, or any other soldier, "most distinguished himself by his galantry in action and other soldier-like qualities so as to entitle him to a "medal of honor."

The claimant for this great distinction has made no application to the proper authority under existing law to determine his right, and Congress can not justly or properly undertake to determine the question. Your committee therefore report the resolution back to the Senate adversely and recommend its indefinite postponement.

O

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 392.

IN THE SENATE OF THE UNITED STATES.

MAY 11, 1894.—Ordered to be printed.

Mr. DAVIS, from the Committee on Military Affairs, submitted the following

ADVERSE REPORT:

[To accompany S. 1064.]

The Committee on Military Affairs, to whom was referred the bill (S. 1064) for the relief of Johial W. Boyd, late of Company C, Sixth Minnesota Volunteer Infantry, have had the same under consideration and respectfully report adversely upon the bill and recommend that it be indefinitely postponed.

O

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 393.

IN THE SENATE OF THE UNITED STATES.

MAY 11, 1894.—Ordered to be printed.

Mr. DAVIS, from the Committee on Military Affairs, submitted the following

ADVERSE REPORT:

[To accompany S. 1298.]

The Committee on Military Affairs, to whom was referred the bill (S. 1298) to remove from the rolls of the Army the charge of desertion against Neil Patton, late of Battery F, Second U. S. Artillery, and to grant him an honorable discharge, have had the same under consideration and respectfully report adversely and recommend that the bill be indefinitely postponed.

O

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 394.

IN THE SENATE OF THE UNITED STATES.

MAY 11, 1894.—Ordered to be printed.

Mr. DAVIS, from the Committee on Military Affairs, submitted the following

ADVERSE REPORT:

[To accompany S. 811.]

The Committee on Military Affairs, to whom was referred the bill (S. 811) for the relief of F. Halverson French, have had the same under consideration and respectfully report:

That an examination of the military record of the beneficiary under the bill fails to disclose any justifiable ground for his restoration to the rolls of the Army, and the bill is therefore reported adversely, with the recommendation that it be indefinitely postponed.

O

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 395.

IN THE SENATE OF THE UNITED STATES.

MAY 11, 1894.—Ordered to be printed.

Mr. DAVIS, from the Committee on Military Affairs, submitted the following

ADVERSE REPORT:

[To accompany S. 873.]

The Committee on Military Affairs, to whom was referred the bill (S. 873) for the relief of Capt. Robert McClermont, having had the same under consideration, respectfully report:

That a careful review of his military record and of the circumstances attending his resignation from the Army compels the committee to report the bill adversely, and to recommend that it be indefinitely postponed.

O

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 396.

IN THE SENATE OF THE UNITED STATES.

MAY 11, 1894.—Ordered to be printed.

Mr. PROCTOR, from the Committee on the District of Columbia, submitted the following

REPORT:

[To accompany S. 1359.]

The Committee on the District of Columbia, to whom was referred the bill (S. 1359) to amend an act approved July 15, 1882, entitled "An act to increase the water supply of the city of Washington, and for other purposes," having carefully considered the same, beg leave to report as follows:

There can be no question of greater importance to the people of any large city than that of securing a sufficient supply of water, pure in quality and with a reserve in quantity ample for the demands of the future. Here it is not merely a local question, but one of importance to the whole country as well. Washington is the temporary residence of thousands, and is visited annually by millions coming from all parts of the country. The United States owns a large share of the property. The public buildings, parks, and grounds, as a whole, are the finest in the world. The demand for new buildings and other improvements will be frequent and imperative, as the machinery of government must continually and steadily increase with the increase of population of the whole country. Whatever concerns the welfare of this city, therefore, will become more and more of general interest.

The present supply of water is not sufficient in quantity or force for present needs; some action must, therefore, be taken at once. The situation is so fully stated in the able report of Col. Elliot, of the Corps of Engineers, who is now in local charge of the aqueduct and water supply, that little need be said in way of detail. The riparian and water rights at Great Falls are now owned by the Great Falls Manufacturing Company, the Chesapeake and Ohio Canal Company, and the United States. The extent of the Government's present interest is in dispute. The main question presenting itself to the committee is whether to recommend the taking, under the right of eminent domain, of a supply for ordinary purposes sufficient for many years to come, or whether to acquire at once all the rights to the water at that point, settle the existing differences and all danger of future controversies about title, and end forever any danger of a short supply and the continual trouble and risk of a divided ownership.

If an individual or a business corporation was in the precise situation of the Government, owning a part of the water rights, under the

necessity of adding thereto at once, and with the certainty of needing further additions from time to time, there can be no doubt that the party would seek, as a matter of prudence and common business foresight, to acquire the entire water right before extensive improvements were made by the other owners which would greatly enhance the cost. And in this case what would be good policy for an individual or private corporation would be the more so for the Government by reason of the certainty of continuing and increasing requirements. The supply, to be sure, is much larger than will be needed for aqueduct purposes, so far as can be foreseen, but even for this purpose alone your committee believe that it would be wise to control it all.

But there is another point worthy of consideration, and that is the rapidly increasing tendency towards municipal control of certain matters of public necessity and convenience in which the entire people, all classes and conditions, have substantially an equal interest. In our early history turnpikes, owned by private corporations, were common; toll bridges the rule, and towns and cities often obtained their water supply from private companies. Now, turnpikes and toll bridges are relics of the past; the water supply in large towns is almost without exception now furnished by the municipality, and street lighting by the city is already being considered and adopted to quite an extent. Whether it is not feasible and economical for cities to generate and supply by electricity heat as well as light, is a question already mooted. If generally adopted within twenty-five years, it would be no stranger than the progress of the last quarter of a century. But laying this possibility aside, the matter of lighting is a present issue, and one of greater importance in this city than in any other on account of the large number of buildings to be lighted at public expense.

Already several measures providing for Government ownership of a lighting plant have been proposed.

All the area of more than 100 feet elevation above low water at the navy-yard is now supplied by pumping, and for want of sufficient pressure all above 75 feet will probably soon require it. The line of 100 feet elevation runs in the vicinity of Florida avenue, and of 75 feet in the vicinity of Massachusetts avenue, west of Eleventh street. The time can not be far distant when a large majority of the residences will be elevated above this line. The vicinity of Tenallytown has an elevation of more than 400 feet above low tide. The pumping is now done at the pump house on U street, between Sixteenth and Seventeenth, at a large expense, and this expense will be constantly increasing as higher lands about the city are built up and higher buildings constructed. It might be done with great saving for the future by electricity generated by the water power at Great Falls.

If the entire power at Great Falls is acquired, we believe it will be ample for electric lighting and pumping purposes for the city. The Great Falls Power Company have very recently obtained new charters from the legislatures of Virginia and Maryland. Their purpose is evidently to develop the power and supply it directly, or through other companies, to the city for lighting and other purposes.

There are no improvements now at Great Falls, except the aqueduct dam, built and owned by the United States. If the Government is ever to acquire control it should be done before any outlay is made by the other owners. Such outlay must be to them a questionable investment, in view of the fact that the Government is sure to require an increased supply from time to time in the future, thus endangering the business of the power company and destroying or greatly lessening the

value of their improvements, with the risk that they may not be sufficiently recompensed. Your committee are therefore of the opinion that all the water and riparian rights at Great Falls necessary for the control and use of the entire power should be acquired at this time; that it will be a wise economy to do so; that ownership in part by the United States and in part by private business corporations is a relation unwise and unsafe for the Government, and should be terminated at once; that the other owners can afford to surrender their rights now on much better terms for the Government than after they have made their improvements, and that no outlay of money can contribute more than this to the future welfare of the capital of the country.

OFFICE OF THE COMMISSIONERS
OF THE DISTRICT OF COLUMBIA,
Washington, March 6, 1894.

DEAR SIR: The Commissioners have the honor to return herewith Senate bill 1359, entitled a bill to amend an act approved July 15, 1882, entitled "An act to increase the water supply of the city of Washington, and for other purposes," and to respectfully suggest that as the Washington Aqueduct and the dam at Great Falls are under charge of the War Department, that the bill be referred to the honorable Secretary of War. The Commissioners remark that there is a present need of an increased supply of water for the District, and submit for the information of the committee the inclosed copies of reports from Mr. S. T. Thomas, attorney for the District, and from Captain Derby, Corps of Engineers, assistant to the Engineer Commissioner, in charge of the water department of the District.

Very respectfully,

JOHN W. ROSS,
President Board of Commissioners, District Columbia.

Hon. ISHAM G. HARRIS,
Chairman Committee on the District Columbia, U. S. Senate.

WASHINGTON, *January 23, 1894.*

To the Hon. Commissioners, etc.:

GENTLEMEN: I have the honor to return to you herewith Senate bill 1359 (Fifty-third Congress, second session), to amend the act of July 15, 1882, providing for the increase of the water supply of this city, together with my views thereon agreeably to your reference of the 20th instant. In order to correctly understand the relation between the District and the United States in reference to the Washington Aqueduct, it is necessary to refer briefly to the legislation by Congress on the subject. As early as 1819 Congress appropriated money to "lay pipes to supply the President's house and the Executive Departments of the Government with water." Many plans for a water supply had been proposed to Congress, but nothing of any consequence was accomplished until 1852 (10 Stat., 92). In that year the civil and diplomatic appropriation bill contained an item of $5,000, "to enable the President of the United States to cause the necessary surveys, projects, and estimates to be made for determining the best means of affording the cities of Washington and Georgetown an unfailing supply of good and wholesome water, report thereof to be made to Congress at its next session." This appropriation was the beginning of what has since become one of the greatest aqueducts of modern times. In execution of the above clause of the appropriation bill President Fillmore transmitted to Congress the report of Gen. Totten, of the Corps of Engineers of the Army, recommended the construction of an aqueduct from the Great Falls of the Potomac to Washington.

This appropriation was followed in 1853 by one of $150,000 "to be expended under the direction of the President of the United States for the purpose of bringing water into the city of Washington, upon such plans and upon such places as he may approve" (10 Stat., 206). With this money the Washington Aqueduct designed to supply the cities of Washington and Georgetown "with pure and wholesome water" was begun. Afterwards, by various acts of Congress extending down to and including an act approved June 25, 1860, the necessary money for acquiring land and the construction and completion of the aqueduct was appropriated. On March 3, 1863, Congress passed an act amendatory of its act of March 3, 1859, authorizing the corporations of Washington and Georgetown to levy and collect a water tax on all real property which borders on an avenue or street through which a water main has been laid "for the purpose of paying for such mains." Said tax to be collected in five installments, and to constitute a fund to be used "exclusively to defray the cost of distribution of water, and other matters connected therewith." By the same act the city of Washington was authorized to erect fire plugs and to collect a tax thereon. In virtue of this authority the city of Washington passed various ordinances on the subject (Webb's Digest, 294–418). On July 12, 1876, Congress (19 Stat., 83) extended the laws and ordinances of the city of Washington relating to water taxes, water rents, and water main taxes over the entire District. On June 10, 1879 (21 Stat., 9), the water service of the District of Columbia was placed under the control of the Commissioners, excepting such powers and duties only as belong to the Chief Engineer of the Army.

On July 1, 1882 (22 Stat., 135), the operations of the water department of the District were placed under the direction of the engineer's office of the District, subject to the control of the Commissioners. By act of Congress approved July 15, 1882, to increase the water supply of the city of Washington, the Secretary of War was required to cause a survey to be made, and a map of the land necessary to extend the aqueduct, and of the land necessary for a reservoir near Sixth street extended, and a like survey and map of land necessary for the dam across the river at Great Falls including the land now occupied by the dam and the land acquired in the extension of said dam across Conns Island to the Virginia shore, one-half the cost of said improvement to be charged to a "capital account" on the books of the Treasury, and the surplus water rents paid into the Treasury, and credit to the account thus created until it is extinguished. And the Commissioners were authorized to regulate water rents from time to time so as to make them sufficient to pay the expense of maintaining the works and the interest on said "capital account" in accordance with the provisions of said act; that after the extinguishment of said account, and until further action by Congress, the surplus water rents were to be paid into the Treasury of the United States (22 Stat., 168). By act of Congress approved July 5, 1884, it is made the duty of the Commissioners to include in their annual estimates for the expenses of the water department, the estimate to be made by the Secretary of the Treasury of the amount necessary to refund one-half, in not less than twenty-five installments, of the expense of the water supply extension advanced by the United States under the act of July 15, 1882.

By act of Congress approved June 17, 1889, the Commissioners were authorized to lay water mains and water pipes and to erect fire plugs and hydrants wherever the same might in their judgment be necessary (26 Stat., 159).

It will thus be seen that the plant which supplies this city with water is the property of the United States. The legislation proposed by the present bill is a departure from the policy of the United States in regard to the Washington Aqueduct, maintained without interruption for more than forty years. With the exception of the worthless "Lydecker Tunnel," constructed under the act of July 15, 1882, this District has never been called upon to pay any part of the expense of constructing the Washington Aqueduct. It can never use the water as a source of revenue, and its expenses so far, except in regard to the worthless tunnel, above referred to, have been limited to the cost of laying mains for the distribution of the water after it is brought to the city. However, if the District is to be again charged with half the expense of enlarging the Washington Aqueduct at Great Falls, it seems to me that it would be eminently proper to amend the eighth section of the bill so as to enable its Commissioners to participate in deciding the question whether what is desired by the bill is necessary. At least two of the Commissioners should be added to the board provided for in section one. Of course with the growth of the city there is a demand for increased water supply, and the land and water rights proposed to be acquired by the present bill will at some time be necessary to increase that supply, if it is not now necessary, and the sooner, in point of economy it is acquired, the better. But it does seem to me in so important a matter as this, which involves a departure from a policy which has prevailed for nearly half a century, and a charge against the District of Columbia of one-half of the expense of enlarging the aqueduct at Great Falls, it is manifestly proper that the Commissioners should be consulted. And then, too, as pointed out by Capt. Derby, the time, ninety

days, within which the Attorney-General and the Secretary of War shall specify the metes and bounds of the land required, is too short. It should be at least six months or one year.

Very respectfully,

S. T. THOMAS,
Attorney, District Columbia.

JANUARY 18, 1894.

The question of what the District of Columbia has in the water rights at Great Falls on the Potomac is one on which the water department of the District is not informed, the supply of water having heretofore been entirely furnished by the United States under the management of the Chief of Engineers, U. S. Army. Doubtless a copy of this bill has been sent to the Secretary of War for examination and report.

There can be no doubt that the United States and the District of Columbia should own the rights to at least twice the amount of water that is now taken from the Potomac, say 3,000,000 gallons per day; and that, if they do not now own these rights, it would be more economical to secure them now than later.

As to whether it would be advantageous to the District and the United States to own more of these water rights than the amount above mentioned, would depend on how much water these is available and how much it would cost to get control of it. The bill provides (section 3) means of throwing light on these points, and this result, at least, is most desirable. The period of ninety days specified in section 1 is too short and should be increased to one year.

As under section 8 the District is required to bear half of the expense of carrying out the act, the board provided for in section 1 should, in my judgment, be increased by the addition of two of the Commissioners of the District of Columbia; all parties concerned should certainly have a voice in determining the important question as to whether the proposed purchase is worth the cost of it.

G. MCC. DERBY,
Captain, Corps of Engineers, U. S. Army.

OFFICE OF THE CHIEF OF ENGINEERS, U. S. ARMY,
Washington, D. C., March 24, 1894.

SIR: I have the honor to return herewith S. 1359 (Fifty-third Congress, second session), "A bill to amend an act approved July 15, 1882, entitled 'An act to increase the water supply of the city of Washington, and for other purposes,'" with letter of the Committee on the District of Columbia, U. S. Senate, of March 9, 1894, and other papers referred to this office therewith.

Attention is invited to the remarks herewith of Col. G. H. Elliot, Corps of Engineers, in immediate charge of the Washington Aqueduct, and to the amendments of the bill recommended by that officer. Certain of these amendments are indicated in copy A of the bill, herewith.

But Col. Elliot states that it is not apparent that the bill thus amended, having become a law, would authorize the use by the United States of water, acquired under the bill, for actuating hydraulic machinery (turbines) located below the falls, and also suggests additional amendments looking to the taking of all of the water flowing at Great Falls. These additional amendments are indicated on copy B of the bill, herewith.

I concur in the recommendation that the bill be amended as indicated on copy B, and further recommend that, if the bill is to become a law, it shall be so worded as to enable the United States not only to acquire title to all lands and water rights at and in the vicinity of the Great Falls, but also to use the water so taken to actuate machinery located anywhere, in connection with the public service of the District of Columbia.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,
Brigadier-General, Chief of Engineers.

Hon. DANIEL S. LAMONT,
Secretary of War.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., March 20, 1894.

GENERAL: In respect of bill S. 1359, Fifty-third Congress, second session, "A bill to amend an act approved July 15, 1882, entitled, An act to increase the water supply of the city of Washington, and for other purposes", which you sent me on the 9th instant for report (E. D. 5250–1894), I beg to state as follows:

The bill, it will have been observed, was introduced into the Senate "by request." It relates exclusively to land and water rights at Great Falls, and, while it is in most respects an excellent bill, there are certain amendments that should be made in the interests of the United States and the District of Columbia, which is required to pay one-half of whatever sums are to be expended for the purchase of these land and water rights.

The act of July 15, 1882, provided, among other things, for the acquisition by condemnation of the outstanding title, if any, to the land necessary for a dam across the Potomac River at Great Falls, including the land then occupied by the dam, the land required for the extension of the dam across Conns Island to and upon the Virginia shore and the land on which the gate house stands. The act provided also for the acquisition of certain unspecified water rights, and contained an appropriation of $45,000 to pay for all of these lands (except the land occupied by the gate house, which was not provided for), and for the water rights in the following item:

"To pay for water rights and land necessary to extend dam at Great Falls to the Virginia shore, forty-five thousand dollars."

The act also contained the following item:

"For work and material to complete the dam at Great Falls to the level of one hundred and forty-eight feet above tide, and extend the same to the Virginia shore, one hundred and forty-five thousand one hundred and fifty-one dollars."

The proceedings to be had in condemnation were prescribed as follows:

"When the map and survey are completed, the Attorney-General shall proceed to ascertain the owners or claimants of the premises embraced in the survey, and shall cause to be published, for the space of thirty days, in one or more of the daily newspapers published in the District of Columbia, a description of the entire tract or tracts of land embraced in the survey, with a notice that the same has been taken for the uses mentioned in this act, and notifying all claimants to any portion of said premises to file, within its period of publication, in the Department of Justice, a description of the tract or parcel claimed, and a statement of its value as estimated by the claimant. On application of the Attorney-General, the chief justice of the supreme court of the District of Columbia shall appoint three persons, not in the employ of the Government or related to the claimants, to act as appraisers, whose duty it shall be, upon receiving from the Attorney-General a description of any tract or parcel the ownership of which is claimed separately, to fairly and justly value the same and report such valuation to the Attorney-General, who thereupon shall upon being satisfied as to the title to the same, cause to be offered to the owner or owners the amount fixed by the appraisers as the value thereof; and if the offer be accepted then upon the execution of a deed to the United States in form satisfactory to the Attorney-General, the Secretary of War shall pay the amount to such owner or owners from the appropriation made therefor in this act.

"In making the valuation the appraisers shall only consider the present value of the land without reference to its value for the uses for which it is taken under the provisions of this act.

"The appraisers shall each receive for their services $5 for each days' actual service in making the said appraisements.

"Any person or corporation having any estate or interest in any of the lands embraced in said survey and map who shall for any reason not have been tendered payment therefor as above provided or who shall have declined to accept the amount tendered therefor, and any person who, by reason of the taking of said land, or by the construction of the works hereinafter directed to be constructed, shall be directly injured in any property right, may, at any time within one year from the publication of notice by the Attorney-General as above provided, file a petition in the Court of Claims of the United States setting forth his right or title and the amount claimed by him as damage for the property taken or injury sustained; and the said court shall hear and adjudicate such claims in the same manner as other claims against the United States are now by law directed to be heard and adjudicated therein: *Provided,* That the court shall make such special rules in respect to such cases as shall secure their hearing and adjudication with the least possible delay."

The act also contained the following requirements:

"Judgment in favor of such claimants shall be paid as other judgments of said court are now directed to be paid; and any claimant to whom a tender shall have been made as hereinbefore authorized and who shall have declined to accept the

same, shall, unless he recover an amount greater than that so tendered, be taxed with the entire cost of the proceeding. All claims for value or damages on account of ownership of any interest in said premises, or on account of injury to a property right by the construction of said works, shall, unless a petition for the recovery thereof be filed within one year from the date of the first publication of notice by the Attorney-General as above directed, be forever barred: *Provided*, That owners or claimants laboring under any of the disabilities defined in the statute of limitations of the District of Columbia may file a petition at any time within one year from the removal of the disability.

"Upon the publication of the notice as above directed, the Secretary of War may take possession of the premises embraced in the survey and map, and proceed with the constructions herein authorized; and upon payment being made therefor, or without payment, upon the expiration of the times above limited without the filing of a petition, an absolute title to the premises shall vest in the United States."

The dam was extended and completed as specified in the years 1884–'86 at a cost of about $140,000.

I was not placed in charge of the aqueduct till several years afterwards, but it can be stated that neither the land occupied by the dam, which was taken by the right of eminent domain, nor the water rights have been paid for.

The following claims for the land and water rights taken and the damages resulting from the taking were filed:

The Chesapeake and Ohio Canal Company, by Lewis C. Smith, president, a claim for $600,900. The Great Falls Manufacturing Company, by Benjamin F. Butler, president.

The claims of this company were stated in the following terms:

"If the condemnation be for all of its water rights, the company estimates its damage at $1,000,900 and claims this amount.

"If the condemnation be for one-half of said rights, then the company claims $500,000.

"If the United States shall consent to let the company draw from the dam the surplus and unused water and shall provide the means for such drawing, a further reduction of the claim will be made."

I send herewith a plat explanatory of this report, in which I shall endeavor to draw attention to the great importance of a careful and cautious consideration of the bill.

The plat shows Conn's Island, the Maryland and Virginia channels separated by it, and the site of the dam, about 3,000 feet long, as it now exists, extending from shore to shore of the river.

The dam as it was at the date of the passage of the act extended out from the Maryland shore of the river above the falls and below the intake of the Washington Aqueduct, across the Maryland channel to the shore of Conn's Island, and was 1,034 feet long. The necessity of the extension of the dam provided for in the act arose from the fact that by reason of its narrow width, shallow depth, and its obstructions, the Maryland channel was found to be inadequate to furnish to the aqueduct all the water required to meet the increasing demands upon it.

The land taken under the act mainly consisted of a narrow strip extending from the *medium filum aquae* of the Virginia channel to the western shore of Conn's Island; thence across Conn's Island to the eastern shore; thence to the *medium filum aquae* of the Maryland channel. The strip did not extend from the *medium filum aquae* of the Virginia channel to the Virginia shore for the reason (see the plat) that the United States was already, from 1854, a riparian owner at the Virginia end of the proposed extention of dam.

There was also included in the taking a small triangular portion of the bed of the Virginia channel between the *medium filum aquae* of the channel and the Virginia shore that was not covered by the riparian right of the United States as an owner on that shore, the lot on which the gate house stands, and also the land on the Maryland shore below this lot, extending to the shore, and covering in addition that part of the river-bed site of the Maryland end of the old dam that was not already the property of the United States.

The area of the land taken is in all about 21 acres. Of this about 8¾ acres are on Conn's Island; about 2½ acres are on the Maryland shore; about 7 acres are on the bed of the Potomac, in the Virginia channel, and about 2¾ acres are on the bed of the Potomac, in the Maryland channel—in other words, about one-half of the entire area is covered by water.

Great Falls is a series of rapids in the river, extending about one-half or three-fourths of a mile, in the course of which the river falls about 70 feet. It is about 16 miles above Washington. The eastern shore of the river is in Montgomery County, Md., and the jurisdition of Maryland extends to the western shore, which is in Fairfax County, Va. The three principal owners of the lands adjacent to Great Falls are the Great Falls Manufacturing Company, the Chesapeake and Ohio Canal Company, and the United States. A fairly good estimate may be formed of

the extent of their respective ownerships by an inspection of the plat and comparing the lengths of the mainland and island shores owned by them.

The only existing improvement of water rights at the falls is the aqueduct dam built by the United States.

Conn's Island is above the falls proper. It is about 3,500 feet long, about 1,000 feet wide at the widest place, and about 670 feet wide at the place near the foot of the island where it is crossed by the extension of the aqueduct dam. Its axis is about parallel with the thread of the current of the river, which at the falls runs about due south. The island is low and, where it is crossed by the extension of the dam, rocky. It is cut up by numerous channels, and the major part of the entire island is, during ordinary spring freshets, overflowed by the river.

The island is unimproved and uninhabited. The land is of but little value, if any. As a riparian owner, the Great Falls Manufacturing Company claims an interest in the water that flows both in the Maryland and Virginia channels, and it is this ownership that has been the basis of litigation and of claims against the United States for thirty years. The United States is a riparian owner opposite Conn's Island both on the Virginia and Maryland shores, and if the assumption that the proportion of right of control of the water flowing in an unnavigable channel, held by each of two opposite riparian owners, does not depend on the relative lengths of their shore lines be correct, then it would appear that the United States has as much of the right of control of the water flowing on each side of Conn's Island as have the owners of the island.

Land on the Maryland shore at Great Falls may be worth $200 an acre, but not more. I am told that land on the Virginia shore is worth from $20 to $30 an acre.

I invite attention to the following important points in the act of July 15, 1882, and in Senate bill 1359.

(1) The amount authorized by Congress to be expended under the act is, for land and water rights at Great Falls, limited to $45,000.

The amount that, for the same object, may be expended under the provisions of the bill if enacted in its present form, and if the prices for the land and the water rights can be agreed on with the owners, is apparantly unlimited. In the cases where there be no agreement the owners may institute suits in the Court of Claims, and the judgments of the court are apparently to be paid without limit by the Treasury Department.

(2) The act contains the following provision:

"In making the valuation the appraisers shall only considered the present value of the land without reference to its value for the uses for which it is taken under the provisions of this act."

There is no such provision in the bill, but for the reason that the value of its water supply to Washington or any increase thereof is inestimable, there being no standard of values that can properly be applied to it, I think it important that a provision similar to the foregoing should be applied to the water rights as well as the land at Great Falls to be taken under the terms of the bill.

(3) The bill requires that the land and water rights at Great Falls are to be taken to the extent that may be deemed "necessary for the present and future supply of said District of Columbia, the water so taken to be used for any and all purposes." This is not contained in the act which the bill proposes to amend. The present supply to the city is about 45,000,000 gallons per diem. If provision is to be made for future supply, either in this bill or elsewhere, the amount should, I think, be stated at 200,000,000 gallons per diem. This, for the reason that from computations that I made after the last census of Washington (1890), I found the supply per diem per capita to be about 200 gallons, and I am of the opinion that if we are now to make arrangements for all time provision should be made for not less than 1,000,000 inhabitants.

(4) The bill provides (section 2) that in cases of agreement with the owners as to the prices of land and water rights taken, and where there be disagreements in cases of judgments rendered by the Court of Claims, the officials specified in the bill "shall have authority to enter into contracts with the owners of the land adjacent to the Great Falls, respectively, to secure to the latter the right to use, and facilities for using, so much of the water of the Potomac as may not be taken as aforesaid and used by the United States. And to this end they may authorize or permit such structures to be made as may be necessary and the value of any rights thus granted shall be received in part payment of the land and water rights taken as aforesaid."

There is nothing referring to these contracts in the act, and it is difficult to understand the full meaning and intention of this provision. Whatever they may be, it seems to be clear that the bill contemplates that the United States shall secure to the owners of land at Great Falls the facilities for using, as well as the right to use, all of the flow of the Potomac that may not be taken and used by the United States.

Let us suppose, for instance, that the United States, for itself and the District of Columbia, "takes" under the provisions of the bill, that is to say, acquires by an

exercise of the right of eminent domain the right to take 200,000,000 gallons of water per diem. The quantity that may be "taken and used" is different. It is the quantity sent down and to be sent down to Washington through the Aqueduct and future additions to the Aqueduct. It will increase from year to year, and the bill contemplates such increase without additional compensation to the owners of the land and water rights, up to the limit of the quantity "taken."

I can best explain the point I wish to make, in respect of this part of the bill, by figures.

In a suit against the United States for damages in the sum of $500,000 by the Great Falls Manufacturing Company, as owners of Conn's Island (in which judgment was rendered in 1879 against the United States for $15,692), it was agreed on by counsel and accepted by the court, that the low-water flow of the Potomac should be stated at 1,065 cubic feet per second, say 700,000,000 gallons per diem. Excluding the times of freshets, the average flow may be said to be at least 6,500,000,000 gallons per diem. In times of very high water and freshets it is much greater, and in the flood of 1889 it was at the rate probably of not less than 305,650,000,000 gallons per diem.*

Assuming, for illustration, that the quantity of water now "taken and used" by the United States is, say, 45,000,000 gallons per diem, and that the quantity to be "taken" under the provisions of the bill be 200,000,000 gallons per diem, the bill would require that the United States shall secure to the owners of the lands adjacent to the falls the facilities for using (and also the right to use) the following quantities of water per diem:

During low-water flow, say, 655,000.000 gallons now, decreasing to 500,000,000 gallons when the limit of the quantity "taken," say, 200,000,000 gallons per diem, shall be reached.

During average flow (excluding freshets), say, 6,455,000,000 gallons now, decreasing to 6,300,000,000 gallons when the above-mentioned limit shall be reached.

To these quantities should be added the constantly varying (decreasing) difference between the quantity of water "taken" and the quantity of water "used," the latter quantity, as said before, being at this time, say, 45,000,000 gallons per diem.

To "secure" to the owners of the land and water rights at Great Falls the facilities for using the remainder of the flow of the Potomac (whether this remainder be, as it would be, more than two-thirds of the low-water flow and about 97 per cent of the average flow), may mean either to provide these facilities and keep them in repair† or to make the facilities certain.

The explanatory words "authorize and permit" in the next sentence seem to preclude the first of these meanings; but if it should be held to be the true one, the United States would either be obliged to make a cut or cuts in the aqueduct dam through which this remainder could be drawn, or to construct a dam below the aqueduct dam to collect, and from behind which could be transmitted to the manufactories and other works below the falls the water flowing over the aqueduct dam. The first of these would be inadmissible, for the reason that any cut or cuts in the aqueduct dam would impair and make irregular the supply to the city through the aqueduct. To construct across the Virginia channel a dam below the aqueduct dam would cost, say, $150,000.

The second supposed meaning being adjudged the true one, the word "secure" would simply have reference to the manner of drawing up the contract referred to in the section.

The closing words of section 2, viz, "and the value of any rights thus granted" to the owners of the land and water rights "shall be received in part payment of land and water rights taken as aforesaid," are difficult to understand. It requires a quantity to be deducted from another quantity less than itself.

The value to each of the owners of the water rights at Great Falls is the value of his share of the water of the river flowing at that point, and may be stated at a rate per 1,000,000 gallons per diem. The share may be used by its owner for a supply for domestic purposes, or for power, or for both, or he may sell it. The value of the

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*Prof. Babb, American Society Civil Engineers of the Geological Survey, in a paper on the Hydrography of the Potomac Basin (1891), gives the following averages of flow of the Potomac at Great Falls. His statements are in cubic feet, and I have reduced them to gallons:

Average flow of the Potomac at Great Falls, in gallons per diem.

1886	8,107,128,000	1889	21,327,624,000
1887	7,698,240,000	1890	13,846,464,000
1888	9,956,020,000	1891	17,449,344,000

† In the claim of the Great Falls Manufacturing Company (see *ante*) are the following words: "If the United States * * * shall provide the means for such drawing."

land, apart from the value of the water rights, is its value for sites of manufactories below the falls; for sites of dwellings for workmen and others, and for the location of canals leading from the head of the falls to the works.

In the case supposed, the United States "takes" under the operation of section 1 of the bill, that is, secures a right to take, a water supply for a population of 1,000,000 inhabitants, say, 200,000,000 gallons per diem. This is the "water right taken." The United States also "takes" about 21 acres of land, about one-half of it being in the bed of the Potomac and the other half being a rocky and uncultivable strip across Conns Island. This is the "land taken."

The words "rights thus granted," near the end of section 2,refer to the right to be secured to the owners of the land by the United States of using, as has just been explained, the remainder of the flow of the Potomac, say two-thirds of the low-water flow and about 97 per cent of the average flow. The value of the water per 1,000,000 gallons per diem (whether it be the water to be taken by the United States, or the remainder to be secured to two of the owners of the falls—the third owner being the United States) should be the same in each case, but in section 2 it is said "the value of any rights thus granted shall be received in part payment of the land and water rights taken." The value of the water "rights thus granted," is immensely superior to the value of the "water right taken," as may be seen by comparing the quantity of water "granted" with the quantity of water "taken," and the difficulty of understanding what is intended by requiring that the value of the former shall be received in part payment of the latter is not explained by the fact that in addition to the "water rights taken" there was "land taken," for, being above the falls, the land is not valuable for any of the purposes just mentioned, and apart from its water rights it is certainly not worth more than $1,000.

If, under the terms of the bill, all of the water rights at Great Falls, that is to say the entire flow of the Potomac, could be "taken" by the United States—provision being made that all the water not required by the United States should be "granted" back to the owners of the water rights—the intention of section 2 would be apparent, but the bill gives authority to "take" only the quantity of water deemed necessary for the present and future supply of the District of Columbia, say 200,000,000 gallons per diem. The intention of the section would also be apparent if it should, in the opinion of the drawer of the bill, have been considered that the value per 1,000,000 gallons of the water to be "granted" back and secured to the owners of the land, is exceedingly small as compared with the value per 1,000,000 gallons of the water to be "taken" by the United States.

If, as might be inferred from the bill, the co-owners with the United States actually own all the remainder of the water that is not drawn from the river by the Aqueduct, I do not see the necessity, or, as there is a question as to this ownership, the propriety of confirming it by contracts. I think, therefore, that all of section 2 after the word "entitled" in line 7 and all of section 3 comprised between and including the word "and" in line 6 and the word "States" in line 9 should be stricken out of the bill.

(5) It will have been observed that provision was made in the act of 1882 and provision is made in this bill for the ascertainment and payment of damages. The damages referred to are damages to water rights, that is, the diversion of water from the river above the falls through the aqueduct to Washington. This is evidenced by the claims filed under the provisions of the act and by previous claims and by the suit of the Great Falls Manufacturing Company against the United States to which reference has already been made. That caution should be observed in the consideration of what the bill contains respecting these damages is made manifest:

(A) By comparing the magnitude of the extravagant claims for damages already filed with the very small proportion of the water now diverted and of the water that can under the terms of the bill be diverted to Washington as compared with the total flow of the river, and by comparing also the amount of these claims with the amount ($45,000) that Congress in its act of 1882 deemed sufficient to pay for all the land and water rights at Great Falls that were to be taken under the act.

(B) By an inspection of the plat entitled "Great Falls of the Potomac and Vicinity" which accompanies this report it will be seen that, thanks to the wise foresight about forty years ago of the late Gen. Meigs, the United States is owner of a tract (of about 6 acres) at the Virginia end of the dam; that it is owner of a tract (of about 20 acres) called "Resurvey of Hard to come at," that it is half owner of a tract (of about 99 acres) called "Resurvey on Hard to come at," including Falls Island, and that it is owner of a lot (of about 5½ acres) on which stands the watchman gatekeeper's house, being a part of a tract called Goose Pond.

The total area of these lands is about 130½ acres, and their cost to the United States, including the cost of the water rights belonging to them, was $3,720.

It is also owner of the right (conferred by the decision in 1879 in the case of the suit of the Great Falls Manufacturing Company against the United States) of main-

taining the dam across the Maryland channel at its present height of 148 feet above the height of low tide at the navy-yard at Washington.

As the purchases of the land mentioned carried with them all the water rights belonging to them it would appear, and I have no doubt, although it has so far as I can discover not heretofore been stated or asserted that the United States is of right entitled to more than one-third of all the water rights at Great Falls, and is therefore entitled to more than one-third of all the water flowing there. For the reason that the 45,000,000 gallons per diem now diverted from the river for the supply of Washington is, as has been before stated, but a small fraction of this proportional part of the water, and for the reason that even if there should be diverted the 200,000,000 gallons per diem required for a population of 1,000,000 of inhabitants, this proportional part would still not be nearly reached, I think it extremely doubtful if in respect of their water rights the other owners of land adjacent to the falls have ever been, or will ever be, damaged by the United States by the withdrawal from the river of the water supply of Washington.

(C.) I find in the brief of special counsel for the United States in the suit of the Great Falls Manufacturing Company against the United States for damages to water rights of the former by the construction of the dam across the Maryland channel, which suit was decided in 1879, the following important statement respecting the Toulson tract owned by the Great Falls Manufacturing Company:

"While we do not think the Toulson tract and the riparian rights appurtenant thereto have been invaded by the United States, and contend that they are not entitled to consideration in the present case we deem it proper, in view of the effect which the ascertainment of those rights by the court might have upon a future extension of the dam, to state distinctly our position.

"(1) The court of appeals of Maryland, in a proceeding between the parties to the present suit, held that the State of Maryland, by legislative grant, had conferred, in 1853, upon the United States the soil between the Virginia low-water mark and the *medium filum aquæ* extending from a point above to a point below the falls (21 Md. Rep., p. 119, and pp. 375, 376, 377 record; Baltimore *v.* McKim, 3 Bl., 453.)

"The riparian right appurtenant to the Toulson tract has thus become *res judicata*.

"(2) The court of Maryland had juristiction of the *res* because it was included within the grant to Lord Baltimore in 1632 (*see* Bacon's laws of Maryland, vol. —, p. —); and because, further, no act of Maryland has ever ceded this jurisdiction, and there is nothing to show that Virginia ever claimed it."

If my inference drawn from this statement be the true one, then the Great Falls Manufacturing Company, apart from the rights conferred by its ownership of Conn's Island above the Falls has no interest in the water rights (water) at Great Falls, and the Chesapeake and Ohio Canal Company's land being cut off from the main channel of the river by the interposing land of the United States bordering on this channel, called "Hard to come at," the United States owns of right by far the greater part of all the water rights at the Falls. Without regard to its water rights the Toulson tract is, however, the most valuable land at the Falls, it containing, as before stated, the best site for manufactories and other works below the Falls, and also the remains of the old Potomac canal constructed by General Washington in 1785, which is the best, if not the only, location practicable for a canal from the head of the Falls to these sites.

For the reason that the two co-owners with the United States at Great Falls will no doubt employ, in the trials of the suits for damages that are to be had in the Court of Claims in case of failure of the United States to agree with these owners as to values, lawyers skilled in such cases, I think it most important that the sixth section of the bill be so amended as to authorize and direct the employment by the United States in these suits of special legal counsel conspicuous for known familiarity with and experience in the laws regulating riparian rights and in hydraulics. The eighth section of the bill also should be so amended as to provide for payment of this counsel and of witnesses on behalf of the Government. * * *

The amendments that I have suggested, and a few others, the objects of which will be apparent, would, I believe, thoroughly guard the interests of the United States and the District of Columbia, and, for the reasons that follow, I think it of very great importance that, as amended, the bill be passed as soon as possible. The legislation provided for in the bill as amended, is, in my estimation, more important than any other that has been enacted since the construction of the aqueduct.

(1) The decision of the Court of Claims of 1879 having been mainly in respect of the damage to the owners of Conn's Island by reason of the abutting on that island of the dam across the Maryland channel (or rather by reason of an agreement as to this damage in 1862 between the Secretary of the Interior and the Great Falls Manufacturing Company, which the United States, in the suit decided in 1879, claimed to have been illegal), there has not been since the extension of the dam to the Virginia shore, nor at any time, a judicial decision of the extent of the rights of the United States at Great Falls, and this bill furnishes an opportunity for such decision. When

the decision has been made, it would operate for all time, and, when future additions to the Washington water supply have to be made from time to time, as the population increases, the required quantities can be taken from the river without further action of the courts and without further legislation of Congress except the making of the appropriations necessary for raising the dam and other works, if any, required for these additions.

(2) The lands at Great Falls taken by the United States from the Great Falls Manufacturing Company under the operation of and by direction of the act of July, 1882, and several small parcels of land taken, also without payment, from the Chesapeake and Ohio Canal Company, a portion under the operation of the act of July 15, 1882, and the remainder at previous times, have never been paid for.

The lands taken from the Chesapeake and Ohio Canal Company are: The lot at Great Falls on which stands the gatehouse that regulates the supply of water through the aqueduct to Washington; the land extending from this lot to the Maryland bank of the river, including the right to pass the aqueduct under the canal; the land under which is the upper portion of tunnel No. 1, and the land occupied by the aqueduct between the gatehouse and the head of this tunnel; a parcel of parcel in Montgomery County, Md., occupied by a portion of the aqueduct, and a parcel of land in the District of Columbia occupied by the mains leading from the distributing reservoir to the city.

I am told that the charters of the Chesapeake and Ohio Canal Company, derived from the United States and from Maryland, provide that no adverse possession shall hold against any of its properties. If this be the case, an application of the statute of limitations, even if it should be deemed proper and advisable, could not be made to operate against these lands, some of which have been occupied by the works of the Washington Aqueduct for nearly forty years, and the bill should be so amended as to include these lands, to the end that their values may be judicially and fairly determined and paid to the owners.

(3) The question of what are the rights of the United States at Great Falls, how much of the water of the river it is entitled to, should be settled. The language of the bill seems to imply that these rights are very small in comparison with other rights; that the drawing for the Washington supply of the small quanty of water heretofore used and now used (that is to say, small in comparison with future wants), has been, and is, an infringement on the rights of others, and that damage has been done to others. If this be the case, the facts should be known before any new obligations are created. The time has now come when the water supply of Washington must be increased. It is imperative that the present dam at Great Falls be raised throughout its entire length as soon as an appropriation can be obtained for this purpose, and it is my intention to submit an estimate for the work in my next annual estimates. The necessity for this arises from the fact that in summer during the low stages of the river I find it impossible to keep the distributing reservoir up to the height of 146 feet above datum, which is required for the full service of the mains leading from the reservoir to the city. During these low stages of the river, the aqueduct at its intake lacks, in respect of its height, about 2½ feet of being full, and the dam must be raised accordingly. If the dam be raised 2½ feet, not only would the aqueduct never fail to run full, but the "head" of water being raised at the intake, the velocity through the aqueduct would be very much increased. If the bill be passed before raising the dam, the right of the United States to draw the additional quantity of water from Great Falls will have been obtained by the exercise of the right of eminent domain provided for in the bill, and the work can go on without delay. Otherwise the work may be enjoined in the Maryland court and have to be suspended until the legal questions be decided.

(4) It is desirable that all existing contentions and claims against the United States be settled judicially and fairly in the manner proposed in the bill as amended.

The amendments that I would propose are as follows, and they will be found in the copy of the bill herewith, marked A:

In section 1, line 13, insert after the word "all" the word "public," and in the same line strike out the words "ninety days" and insert the words "six months," and in line 30 insert after the word "amendment" the words "or otherwise."

In section 2 insert after the word "height" in line 5 the words "or by raising the dam to such height as may be necessary for the purpose of this act," and strike out all of the section after the word "entitled" in line 7.

In section 3, after the word "height" in line 6 insert the words "or by reason of raising the dam to such height as may be necessary for the purpose of this act. In making the valuations the appraisers shall only consider the present values of the land and water rights, without reference to their values for the uses for which they are taken under the provisions of this act." And strike out all of the words from and including the word "and" in line 6 to and including the word "States" in line 9.

In section 4, after the word "height" in line 6 insert the words "or by reason of raising the dam to such height as may be necessary for the purpose of this act," and

after the word "States" in line 17 add the words "Provided, that the United States shall be represented in such suits by special legal counsel conspicuous for known familiarity with and experience in the laws regulating riparian rights and in hydraulics."

In section 6, lines 2 and 3, strike out the words "one or more" and insert the word "two."

In section 8, line 7, after the word "referees" insert the words "and of special counsel, and witnesses on behalf of the United States."

It will have been observed that the water to be "taken" under the provisions of the bill is strictly for the supply of the District of Columbia, and that the words "the water so taken to be used for any and all purposes," in the twelfth and thirteenth lines of section 1, refer to use of the water in the District of Columbia. It is not apparent that should the bill become a law the use of Potomac water would be extended to purposes other than the purposes of its present use, viz, domestic supply, supply of the public buildings, street washings, and hydraulic power in the District of Columbia. The use for hydraulic power in the District of Columbia must be very limited by reason of the capacity of the aqueduct and of any probable additions to the aqueduct. Should it be desired to use turbines below the falls to operate electric generators for transmitting electric power to Washington and lighting the public buildings, no portion of the water to be acquired under the bill could be used for these turbines. If Congress would authorize the taking, under the operation of the provisions of the bill, of all the water flowing at Great Falls, there would not only be no limit to the quantity of water available for supply to the District, but there would doubtless be an abundance of water remaining for hydraulic machinery (turbines) below the falls, sufficient to operate a number of electric generators adequate not only for the lighting of the Capitol and all the other public buildings, the lighting of all of our streets, and possibly for the working of machinery for the raising of water to the rapidly increasing portion of the District that is above the area that can be supplied by gravity.

For these reasons I think it would be wise that the United States acquire now, under the exercise of the right of eminent domain provided for in the bill, all of the water and water rights at Great Falls, their owners to be paid the amounts to be ascertained in the fair and just manner described in the bill.

For the reason that the capacity of a river for supply or power or both should probably be measured by its low-water flow, its greater flows being intermittent, the capacity of the Potomac at Great Falls may, according to the finding of the Court of Claims in 1879, be considered as 700,000,000 gallons of water per diem. Deducting, say, 200,000,000 gallons for the supply of the Washington of the future, there would never fail to remain for power to be used for the purposes suggested and any others that the public wants of the United States and the District of Colmbia may develop, a daily supply of less than 500,000,000 gallons, say, 772 cubic feet per second. The fall is, as before stated, about 70 feet.

In view of the foregoing I have prepared another copy of the bill (marked B), in which are the following suggested amendments:

In section 1 strike out the words "such land and" in line 9 and insert the words "all the." Strike out the word "above" in line 10 and insert the words "in the vicinity of." Strike out in lines 10, 11, and 12 the words "as they may deem necessary for the present and future supply for said District of Columbia." After the word "all" in line 13 insert the word "public." After the word "purposes" in line 13 insert the words "and also such land as may be necessary for these purposes." Strike out the words "ninety days" in line 13 and insert the words "nine months." Strike out in lines 17, 18, and 19 the words "and also the quantity of water per day necessary for the above purposes (in addition to the amount already appropriated and paid for)," and substitute therefor the words "excluding the lands already purchased by the United States and paid for," and in line 30, after the word "amendment," insert the words "or otherwise."

In section 2, after the word "height" in line 5, insert the words "or by raising the dam to any height that may be deemed necessary for the future supply of the District of Columbia and other public purposes," and strike out all of the section after the word "entitled" in line 7.

In section 3, after the word "height" in line 6, insert the words "or by reason of raising the dam to such height as may be necessary for the purpose of this act. In making the valuations the appraisers shall only consider the present values of the land and water rights without reference to their values for the uses for which they are taken under the provisions of this act," and strike out all of the words from and including the word "and" in line 6 to and including the word "States" in line 9.

In section 4, after the word "height," in line 6, insert the words, "or by reason of raising the dam to any height that may be deemed necessary for the future supply of the District of Columbia and other public purposes," and after the word "States," in line 17, add the words "*Provided,* That the United States shall be represented in

such suits by special legal counsel conspicuous for known familiarity with and experience in the laws regulating riparian rights, and in hydraulics."

In section 6, lines 2 and 3, strike out the words "one or more" and insert the word "two."

In section 8, line 7, after the word "referees," insert the words "and of special counsel and witnesses on behalf of the United States."

I should add that the lands and water rights at Great Falls appear to be unsettled in respect of their titles, and that I am informed that the claim of the Great Falls Manufacturing Company to the title of the Toulson tract, on the Virginia side of the river, is not acknowledged by the Chesapeake and Ohio Canal Company, which once owned, and still claims to own, the property.

I should also add that it is well understood that the land and water rights of the Great Falls Manufacturing Company have been for some years for sale; also that there is now pending in the Maryland legislature a charter giving to a corporation entitled the Great Falls Power Company, authority to erect such dams or other structures in the Potomac River between the Great Falls and the United States aqueduct dam, as may be necessary for the objects and purposes set forth in the charter, which include the selling and leasing of water power, the using of the same for manufacturing and other purposes, and for generating, transmitting, selling, or leasing electricity, electric power and light, with the provision that nothing in the act "shall be construed to give said Great Falls Power Company authority to interfere with any existing rights of the United States." In case of sale of the company's land and water rights there might be no result other than the succession of a new claimant and litigant against the United States to the Great Falls Manufacturing Company, but in case of the granting of the charter just mentioned by the State of Maryland (it has, as I understand, been already granted by the State of Virginia), I should say that if it be held or claimed that such increase is not covered by an existing right, any attempt by the United States to increase the water supply of the District of Columbia would, in the absence of legislation such as is proposed by Senate bill No. 1359, be very likely to lead to contention and litigation.*

In conclusion I may remark that the legislation provided for in the bill as amended seems to me to be of the highest importance to the United States and the District of Columbia, and, in respect of the water supply of the District of Columbia, more important than any that has been enacted since the completion of the aqueduct thirty years ago. I have pointed out what appear to me to be the objectionable features of the bill, I have suggested additions that seem to me important, and I believe that the bill—if it be amended as proposed—will thoroughly guard the interests both of the United States and the District of Columbia.

I do not think the amendments that I have suggested can reasonably be opposed by either of the two coowners with the United States of the land and water rights at Great Falls, except perhaps in respect of the amendment of section 2 by striking out all of the section after the word "entitled," in line 7. The legislation proposed in this portion of the section would no doubt be of enormous advantage to these coowners, but in my judgment it would be in the highest degree inimical to the interests both of the United States and the District of Columbia, and it would be likely to lead to innumerable law suits.

The papers are herewith returned.

Very respectfully, your obedient servant,

GEORGE H. ELLIOT,
Colonel of Engineers.

Brig. Gen. THOMAS L. CASEY,
Chief of Engineers, U. S. Army, Washington, D. C.

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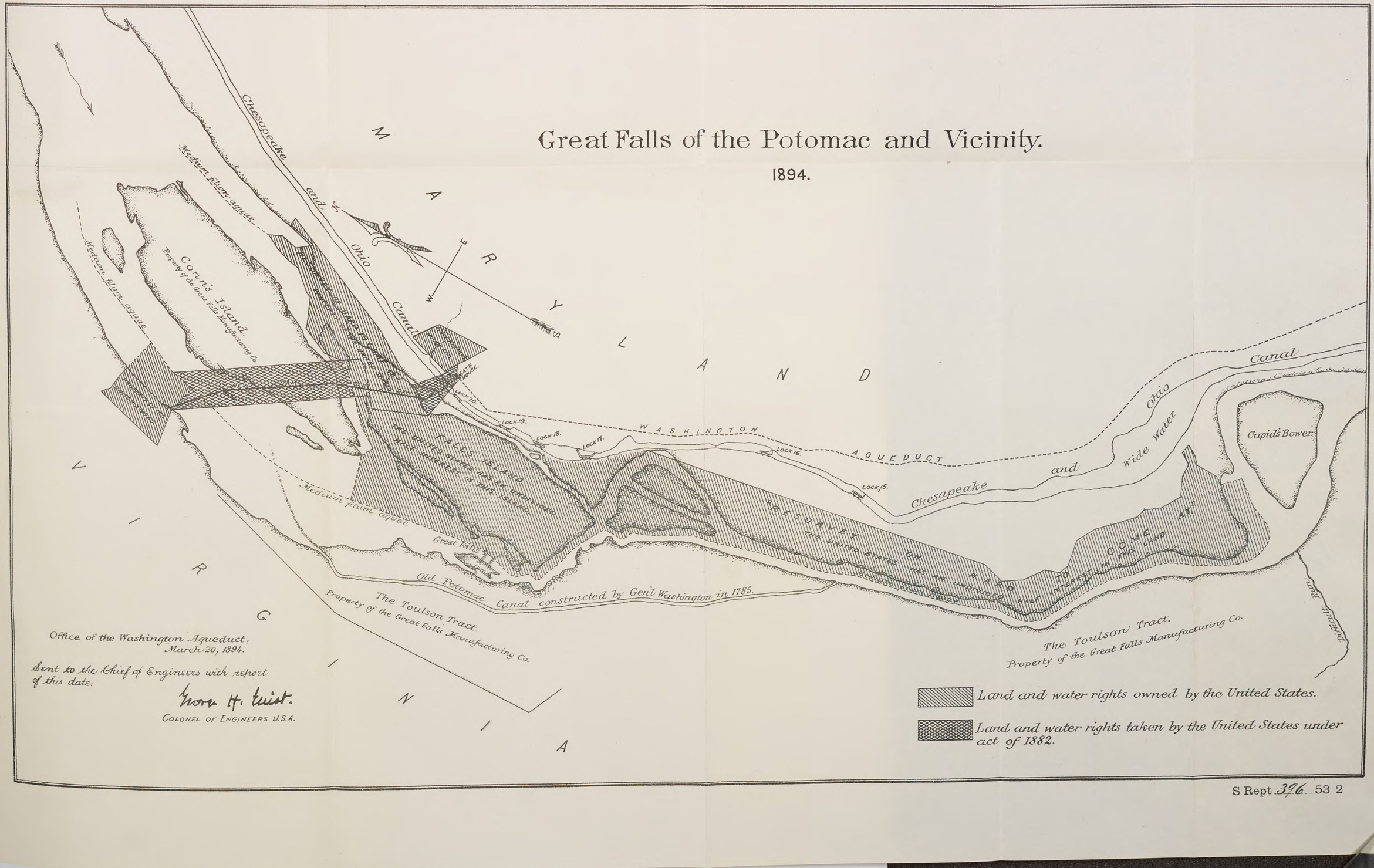
*I understand that the charter referred to has been granted, but that before the passage of the act the Chesapeake and Ohio Canal Company caused to be inserted in the charter a provision that no works shall be constructed by the Great Falls Power Company until the plans have been submitted to the trustees of the canal company, and to the Board of Public Works of Maryland, and approved by each. An agreement is then to be entered into and a bond filed. The United States, which has more at stake, is not thus protected.

Great Falls of the Potomac and Vicinity.

1894.



Office of the Washington Aqueduct.
March 20, 1894.

Sent to the Chief of Engineers with report of this date.

Thos. H. Twist.
COLONEL OF ENGINEERS U.S.A.

Land and water rights owned by the United States.

Land and water rights taken by the United States under act of 1882.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 397.

IN THE SENATE OF THE UNITED STATES.

MAY 11, 1894.—Ordered to be printed.

Mr. BATE, from the Committee on Military Affairs, submitted the following

REPORT:

[To accompany S. 1381.]

The Committee on Military Affairs, to whom was referred the bill (S. 1381) "to provide for the restoration to the Society of the Twenty-second Michigan Infantry Volunteers two flags now in the War Department," having considered the same, report:

This bill, upon are ference to the War Department, elicited the following:

WAR DEPARTMENT,
Washington, D. C., February 8, 1894.

SIR: In returning herewith Senate bill 1381, Fifty-third Congress, second session, "to provide for the restoration to the Society of the Twenty-second Michigan Infantry Volunteers two flags now in the War Department," I have the honor to quote for your information the remarks of the Major-General Commanding the Army, dated the 13th instant, on the bill, and to state that the views expressed by that officer are concurred in by me.

"In my judgment, as a matter of general policy, all flags captured or recaptured by the Army in battle should remain in the custody of the War Department as the property of the United States. As a rule a flag lost by a regiment in battle should, if recovered, not be restored to that regiment unless recaptured by it or with its very distinguished assistance. If it is restored it should be as a special mark of approval, either of the great gallantry of the regiment, notwithstanding its misfortune at the time the regimental flag was lost, or of very marked subsequent gallantry in assisting to recapture it."

Very respectfully,

DANIEL S. LAMONT,
Secretary of War.

The CHAIRMAN OF THE COMMITTEE ON MILITARY AFFAIRS, U. S. SENATE.

Which, in the judgment of your committee, is a correct conclusion, and therefore report adversely, and recommend that the bill be indefinitely postponed.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 398.

IN THE SENATE OF THE UNITED STATES.

MAY 11, 1894.—Ordered to be printed.

Mr. PALMER, from the Committee on Pensions, submitted the following

REPORT:

[To accompany S. 1391.]

The Committee on Pensions, U. S. Senate, to whom was referred the Senate bill No. 1391, granting a pension to Mrs. Levenia D. Athon, widow of Dr. James S. Athon, deceased, of Indianapolis, Ind., late a volunteer surgeon in the service of the United States, having examined the same, report that a similar bill, Senate file No. 2104, granting a pension to Mrs. Levenia D. Athon, was introduced by Senator Turpie and reported favorably February 9, 1892, which bill was carefully examined and a favorable report made to the U. S. Senate, a copy of which is herein submitted as a part of this report, containing the facts in reference to this bill, as follows:

The said claimant is the lawful widow of Dr. James S. Athon, late of Indianapolis, Ind., deceased, to whom she was married on the 15th day of December, 1857, and she has not remarried since his decease. Her husband was a surgeon in the service of the United States in the war of 1861. He was never mustered into the service, but was one of those who were called upon by Governor Morton, of Indiana, in January, 1862, to go to the different hospitals and fields after the battles of Fort Donelson and other engagements, to take care of and treat the sick and wounded volunteers from the State of Indiana serving in the armies of the Union.

Dr. Athon had been a surgeon in the Mexican war, and was, at the time the call was made upon him, in good health and in full practice in the city of Indianapolis, Ind., where he was well known for skill and experience in his profession. He immediately obeyed the call and visited, as appears from the reports now on file in the office of the adjutant-general of the State of Indiana, Indiana troops at the following points: Fort Donaldson, Cairo, Mound City, Winchester, Va., Frederick, Md., Washington, D. C., Baltimore, Md., as well as other points in the neighborhood of where soldiers from the State of Indiana had been wounded or had become sick and were confined to the hospitals. His services in the performance of this duty are described in contemporary accounts of it as very laborious, valuable, and efficient, and it is said by the witnesses to have been done at a heavy loss to his private business and practice, which at the time was large.

It does not appear how long he was engaged in the service, but he left home January 9, 1862, and his last report is dated October 23, 1862.

During this service he was exposed to much hardship, incessant labor, loss of sleep, and other deprivations, and when he returned he was suffering from disease incurred therein, which resulted, as physicians state, in his death. He died at Indianapolis October 25, 1875. The claimant, his widow, is 64 years of age, in very moderate circumstances and poor health. There are precedents for the allowance of pensions in such cases. Mrs. Dr. Bullard and Mrs. Dr. Taylor, the widows of physicians, whose husbands served and incurred disabilities in the same manner, have already been paid pensions by special acts for that purpose.

Your committee think that this is a meritorious case, and therefore report the accompanying bill for the relief of the petitioner and recommend its passage.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 399.

IN THE SENATE OF THE UNITED STATES.

MAY 12, 1894.—Ordered to be printed.

Mr. BRICE, from the Committee on Appropriations, submitted the following

REPORT:

[To accompany H. R. 5894.]

The Committee on Appropriations, to whom was referred the bill (H. R. 5894) making appropriations for the Military Academy for the fiscal year ending June 30, 1895, having considered the same, report the bill to the Senate with amendments, and submit herewith a statement showing the amount of the estimates for the Military Academy for 1895, the amount provided by the bill as passed the House of Representatives, the amount recommended by the committee, and the amount of appropriations for 1894.

MILITARY ACADEMY, 1895.

Amount of estimates for 1895	$463,183.58
Amount of bill as passed the House	401,283.08
Increase recommended by the committee	8,920.00
Amount as reported to the Senate	410,203.08
Amount of act for 1894	432,556.12

The items of increase recommended by the committee to House bill are as follows, namely:

For extra pay of enlisted men of the cavalry detachment	$560
For water pipe, plumbing, and repairs	1,000
For contingencies for Superintendent of the Academy	500
For new mangers and general repairs to cavalry stables	1,460
For building breast-high masonry wall on east side of road from north gate to entrance of post cemetery	800
For placing gas pipes and fixtures in barracks	100
For one steam road roller	4,500
Total increase	8,920

Comparative statement showing the appropriations for 1894; the estimates for 1895; the amounts provided by the House bill; and the amounts recommended by the Senate Committee on Appropriations for 1895.

Object.	Appropriations, 1894.	Estimates, 1895.	House bill, 1895.	Senate committee 1895.
PAY.				
Pay of the Military Academy	$232,115.08	$266,551.78	$233,211.78	$233,211.78
CURRENT AND ORDINARY EXPENSES.				
Repairs and improvements	16,000.00	18,000.00	16,000.00	16,000.00
Fuel and apparatus	20,000.00	20,000.00	20,000.00	20,000.00
Gas pipes, fixtures, lamp posts, etc	1,500.00	1,500.00	1,500.00	1,500.00
Fuel for cadets' mess-hall, shops, and laundry	3,000.00	3,000.00	3,000.00	3,000.00
Postage and telegrams	250.00	250.00	250.00	250.00
Stationery	800.00	800.00	800.00	800.00
Transportation of materials, discharged cadets, etc.	1,750.00	1,750.00	1,750.00	1,750.00
Printing and binding	1,000.00	1,000.00	1,000.00	1,000.00
Clerk to disbursing officer and quartermaster	1,350.00	1,350.00	1,350.00	1,350.00
Clerk to adjutant in charge of cadet records	1,350.00	1,500.00	1,500.00	1,500.00
Clerk to adjutant	1,000.00	1,000.00	1,000.00	1,000.00
Clerk to treasurer	1,500.00	1,500.00	1,500.00	1,500.00
Clerk to quartermaster	1,000.00	1,000.00	1,000.00	1,000.00
Department of cavalry, artillery, and infantry tactics	1,840.00	2,680.00	2,120.00	2,680.00
Department of civil and military engineering	1,756.00	1,756.00	1,256.00	1,256.00
Department of natural and experimental philosophy	3,850.00	2,850.00	2,500.00	2,500.00
Department of instructions in mathematics	968.50	350.00	350.00	350.00
Department of history, geography, and ethics	150.00	150.00	150.00	150.00
Department of chemistry, mineralogy, and geology	2,930.00	2,930.00	2,780.00	2,780.00
Department of drawing	3,126.25	1,450.00	1,450.00	1,450.00
Department of modern languages	200.00	445.50	445.50	445.50
Department of law	550.00	350.00	350.00	350.00
Department of practical military engineering	1,200.00	1,200.00	1,200.00	1,200.00
Department of ordnance and gunnery	8,387.00	7,237.00	4,380.50	4,380.50
Stationery for treasurer's office	50.00	50.00	50.00	50.00
Extra pay for enlisted men	1,980.10	2,136.60	2,136.60	2,136.60
Expenses of board of visitors, including mileage	3,000.00	3,000.00	3,000.00	3,000.00
Total current and ordinary expenses	80,487.85	79,235.10	72,818.60	73,378.60
Miscellaneous and incidental expenses	25,737 50	31,190.00	27,040.00	28,540.00
Buildings and grounds	94,215.69	86,206.70	68,212.70	75,072.70
Total Military Academy	432,556.12	463,183.58	401,283.08	410,203.08

Total of Military Academy acts for the fiscal years 1882 to 1894, inclusive.

1882	$322,435.37	1889	$315,043.81
1883	335,557.04	1890	902,766.69
1884	318,657.50	1891	435,296.11
1885	314,563.50	1892	402,064.64
1886	310,021.64	1893	428,917.33
1887	297,805.00	1894	432,556.12
1888	419,936.93		

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 400.

IN THE SENATE OF THE UNITED STATES.

MAY 12, 1894.—Ordered to be printed.

Mr. FRYE, from the Committee on Foreign Relations, submitted the following

REPORT:

[To accompany S. 1999.]

The Committee on Foreign Relations, to whom was referred the bill (S. 1999) for the relief of Charles T. Russell, late consul of the United States at Liverpool, report the same back to the Senate with a favorable recommendation.

The committee has given careful consideration to all the facts and evidence in connection with this bill and beg leave to submit the following report, made to the House of Representatives from the Committee on Claims, as containing a complete statement of the case and expressing the views of your committee thereon:

[House Report No. 663, Fifty-second Congress, first session.]

The Committee on Claims, to whom was referred the bill (H. R. 3716) for the relief of Charles T. Russell, late U. S. consul at Liverpool, having considered the same, respectfully report:

From the evidence furnished the committee by the Department of State it appears that the said Charles T. Russell, while consul at Liverpool, from 1885 to 1889, inclusive, and while in the discharge of the duties of that office expended for the clerical force necessarily employed by him in the shipment and discharge of American seamen at the port of Liverpool the sum of $3,100. Congress had, prior to the year 1886, provided a fund which the State Department had drawn upon to the amount of about $2,100 annually, to defray the expenses incurred at the consulate in the shipment and discharge of American seamen, but which it had omitted to provide subsequent to the year 1885.

Mr. Russell was obliged to disburse from his own funds the above-named sum to meet the expenses of this service, as appears by the vouchers hereto annexed.

The consul preceding Mr. Russell at Liverpool called the attention of the State Department to the omission by Congress to provide the funds to meet these expenses, and urged the necessity of continuing said appropriation to his successor. The State Department, recognizing the justice of Mr. Russell's claim, advised him to apply to Congress for reimbursement, as that Department had no authority to use any of its funds for the payment of these expenditures.

Your committee find that the amount named in the accompanying bill was actually and necessarily expended by Mr. Russell, and was less than the usual amount expended by his predecessors for such service; that no part thereof has been repaid to him, and that in justice and equity he is entitled to have the same refunded to him by the Government, and recommend the passage of the accompanying bill.

The annexed correspondence is made a part of this report.

UNITED STATES CONSULATE,
Liverpool, June 6, 1885.

SIR: I have to invite the attention of the Department to the omission of Congress to appropriate specifically as heretofore for the expenses attending the shipment and discharge of seamen at this and other consulates.

While personally I have no interest in the Department's action on account of my retirement from consular duties, nevertheless the appropriation for the next fiscal

year will be available, and the urgent needs of the consulate warrants me in requesting, in behalf of my successor, an allowance from the item of $6,000, appropriated by Congress, the expenditure of which is placed at the discretion of the President, for the several consulates and commercial agencies in the transaction of their business.

The sum, from my experience and observation, having in view the proportionate amount of work attending the shipging office at this and other seaport consulates, which I think should be awarded this consulate is $2,000.

In support of the claim for the above-named sum I beg to invite the attention of the Department to my dispatch No. 233, dated June 19, 1883, in which will be found more in detail the facts touching the requirements existing now as then, which need not be repeated in this dispatch.

I shall therefore venture to suggest that the Department at an early day authorize the expenditure of the sum named to defray the expenses of the shipment and discharge of seamen at this consulate for the fiscal year ending June 30, 1886.

I have the honor to be, respectfully, your obedient servant,

STEPHEN B. PACKARD,
Consul.

Hon. JAMES D. PORTER,
Assistant Secretary of State.

UNITED STATES CONSULATE,
Liverpool, November 8, 1889.

Hon. WILLIAM F. WHARTON,
Assistant Secretary of State, Washington, D. C.:

SIR: I desire to bring to the notice of the Department of State, with a view to having the matter brought before Congress at its next sitting, the very heavy expen diture I have been reluctantly obliged to make, during the four years I was consul, in order to carry on efficiently the work in connection with the shipping department of the consulate, the total amounting to £600 10*s.* 6*d.*

When I arrived at my post in June, 1885, I found that in addition to the allowance of $2,000 per annum for clerk hire there was an allowance of $2,100 per annum for the shipment and discharge of seamen, but that after the end of that month it would be discontinued altogether, Congress having made no appropriation.

This matter was brought before the notice of the State Department by my predecessor in his dispatch No. 319, dated June 6, 1885, and also by myself in my Nos. 52 and 91, dated February 1 and December 1, 1886, and I was finally informed that I could not receive any assistance from the Government in that direction, but that the subject would be brought to the notice of Congress—Department instruction No. 91, dated January 19, 1887.

No appropriation, however, was made for that department of the consulate during the whole four years that I was in charge, but the work had to be discharged. It is hardly necessary, I think, for me to say that the work in connection with the shipment and dischage of seamen at a port of such magnitude as Liverpool is very great, and although it was performed with as small a clerical force as possible it has actually cost me the sum of £600 10*s.* 6*d.*, which I paid in addition to the annual allowance for clerk hire.

Seeing therefore that the expenditure is absolutely necessary for clerical work in connection with the shipment and discharge of seamen, I am convinced that if these facts are brought before Congress I will be reimbursed this heavy outlay.

I therefore respectfully claim that the sum stated is due me, and I do so feeling that I am making a just and honorable claim, and one that can not but recommend itself to the consideration of Congress.

Some of the clerks to whom I paid this amount are no longer connected with the office, but I have no doubt I can procure from them a proper voucher for the amount each of them received, but those who remain can certify to this expenditure.

I am, sir, your obedient servant,

CHAS. T. RUSSELL,
Late Consul.

LIVERPOOL, *January 10, 1890.*

I, William J. Saulis, vice and deputy consul of the United States of America at Liverpool, do hereby certify that I was, during the period Mr. Russell was consul here, bookkeeper, and as such had the paying of salaries to the clerks of the consulate; that during the period from July 1, 1885, to June 30, 1889, I paid the sum

of £600 10*s*. 6*d*. for clerical services performed in connection with the shipping department of the consulate in excess of the amount of clerk hire allowed during that period, the said expenditure having been actually and necessarily made, as appears by the books kept by me and now in Mr. Russell's possession.

[SEAL.] W. J. SAULIS,
Vice and Deputy Consul of the United States of America at Livevpool.

I, William Pierce, do hereby make oath and say that during the period 1st July, 1885, to 30th June, 1889, I was employed as clerk in the consulate at Liverpool. From my own knowledge I am aware and know that the sum of £600 10*s*. 6*d*. was actually paid by Mr. Russell in excess of the amount allowed for clerk hire during that period. Part of said amount was paid to myself and the remaining portion to clerks who are not now here.

WM. PIERCE.

Subscribed and sworn to before me this 10th day of January, 1890.
[SEAL.] THOS. H. SHERMAN,
Consul of the United States of America at Liverpool.

UNITED STATES CONSULATE, 26 CHAPEL STREET,
Liverpool, January 11, 1890.

The statements herewith to the vice-consul and Mr. Pierce are entitled to full faith and credit, but I desire to add that I am convinced that the disbursements referred to were actually made and were actually necessary. I am not now paying so much for extra clerks as Mr. Russell paid, because the Department has sent to the consulate a competent consular clerk, but it will be apparent to anyone who visits this office that additional allowance for clerk hire is needed.

THOS. H. SHERMAN,
Consul.

DEPARTMENT OF STATE,
Washington, February 21, 1890.

CHARLES T. RUSSELL, Esq.,
Late Consul of the United States, Liverpool,
Now at 50 Lime Street, London, England:

SIR: Referring to your dispatch of the 22d ultimo, I have to inform you that the Department has no funds out of which it has authority to render such relief as is required by your dispatch.

Your only recourse would seem to be to present your claim for reimbursement of the amount expended for clerk hire to Congress.

I am, sir, your obedient servant.

WILLIAM F. WHARTON,
Assistant Secretary.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 402.

IN THE SENATE OF THE UNITED STATES.

MAY 14, 1894.—Ordered to be printed.

Mr. MCMILLAN, from the Committee on the District of Columbia, submitted the following

REPORT:

[To accompany S. 1952.]

The Committee on the District of Columbia, to whom was referred the bill (S. 1952) to amend an act entitled "An Act to incorporate the Washington and Great Falls Electric Railway," having considered the same, make a favorable report thereon and recommend that the bill pass with amendments.

The subject of an electric railroad between Washington and Great Falls, by way of Cabin John bridge, has been before Congress many years. During the Fifty-second Congress an act was passed incorporating the Washington and Great Falls Electric Railway Company. In that act it was provided that the said railroad should not use the surface of the canal road, but should come into Georgetown by an overhead structure. This provision was made because of the large amount of travel over the narrow canal road. At the same time it was recognized that an overhead structure would be very expensive to build, especially as the further requirements were made that the roadway underneath should be paved and a wall should be built along the canal. At that time, however, there was no other way of solving the problem of allowing a railway to enter Georgetown and at the same time preserving the rights of the public on the canal road. Subsequently, however, a means of getting into Georgetown was found, by way of Prospect street, and to this method of approach no objections have been offered.

The object of the present bill is to change the route at the Georgetown end of the road, so that the route of the Washington and Great Falls electric line shall begin on the tracks of the Georgetown and Tennallytown railway, at the south side of M street, and shall run over the tracks of that company to Prospect street, thence along Prospect street to a point where that street intersects the canal road, thence on land to be acquired by the company, and wholly outside of any road, to and across the Foxhall road, and thence on land to be acquired by the company to the Conduit road, and along and outside of that road and the property pertaining thereto to V street thence across the Conduit road to the route of the Washington and Great Falls electric road, as already provided for in the existing charter.

The committee have taken pains to recommend a route which will not interfere with the public uses of any of the District roads and to preserve all the restrictions embodied in the original act. In order that there may be no question as to the application of the amendments, the bill, as reported, reenacts those portions of the original act which are amended.

The report of the committee in favor of the changes in the bill is unanimous.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 403.

IN THE SENATE OF THE UNITED STATES.

MAY 14, 1894.—Ordered to be printed.

Mr. SHOUP, from the Committee on Pensions, submitted the following

REPORT:

[To accompany S. 1508.]

The Committee on Pensions, to whom was referred the bill (S. 1508) granting an increase of pension to Helen L. Dent, have considered the same and submit the following report:

Mrs. Helen L. Dent, the beneficiary named in the bill, is the widow of the late Frederick T. Dent, colonel, retired, U. S. Army, who devoted forty-four years of his life to active service in the U. S. Army, having served in numerous Indian wars on the frontier and in the Mexican war, during which time he was severely wounded. He also served in the late war of the rebellion, and was many times brevetted for gallant and meritorious service in the field.

There are numerous precedents for increasing the pension of widows of officers by special act of Congress to a much larger amount than the bill provides for, especially where the officers have rendered such long and faithful service. The claimant is 57 years of age, and from evidence on file in the case it appears that she has no property, and her only income is her pension of $30 per month.

Your committee regard this as a proper case for special legislation, and the passage of the bill is therefore recommended, with the following amendment:

In line 7 strike out the word "seventy," and in line 8 strike out the word "five," and insert in lieu thereof the word "fifty."

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 404.

IN THE SENATE OF THE UNITED STATES.

MAY 14, 1894.—Ordered to be printed.

Mr. HAWLEY, from the Committee on Pensions, submitted the following

REPORT:

[To accompany S. 1539.]

The Committee on Pensions, to whom was referred the bill (S. 1539) granting a pension to Josephine Foote Fairfax, have had the same under consideration and submit the following report:

The applicant is the widow of the late Rear-Admiral Donald McNeil Fairfax, of the U. S. Navy, and the daughter of Rear-Admiral Andrew Hull Foote. Both these officers served with great distinction, and their careers reflect credit to a remarkable degree upon the American Navy.

Rear-Admiral Foote was born in Connecticut September 12, 1806. He was a son of U. S. Senator S. A. Foote, of that State. Entering the Navy as a midshipman in 1822, he saw active service almost immediately under the elder Porter in breaking up the piratical haunts in the West Indies. He became lieutenant in 1830.

During the years 1849, 1850, and 1851, while in command of the *Perry*, he did effective service in the suppression of the African slave trade. While commanding the *Plymouth* in China, in 1856, protecting American property during hostilities between Great Britain and China, he was fired upon by the forts on Canton River. An apology being refused he attacked the forts, carrying them by storm. At the outbreak of the war of the rebellion he was selected to command the flotilla forming on the Western waters. His conduct in connection with this and similar subsequent duty was so conspicuously fine that in June, 1862, he received the thanks of Congress and was made a rear-admiral. In June, 1863, he was selected to succeed Rear-Admiral Dupont in command of the fleet off Charleston; but while on his way to assume this command he died in New York, June 26, 1863.

Rear-Admiral Fairfax was born in Virginia March 10, 1821, and appointed midshipman in the Navy August 12, 1837. During the Mexican war he served on the California station and took part in the capture of Mazatlan and Lower California. At the outbreak of the war he had been promoted through successive grades to lieutenant, and was serving as executive officer of the *San Jacinto*. The boarding of the British mail packet *Trent*, and the taking therefrom Mason and Slidell and their secretaries, Eustis and MacFarland, was directed in person by Lieut. Fairfax, a most delicate and important event.

In May, 1862, he was ordered to command the *Cayuga*, reporting to Admiral Farragut, off New Orleans. In January, 1863, he was ordered

North to command the monitor *Nantucket*, just built at South Boston. He was afterwards transferred to the *Montauk*, and participated in all the principal operations before Charleston. He was commissioned as rear-admiral July 11, 1880, and in the following year was placed on the retired list, having been forty-four years in active service, twenty years of which were spent at sea. He died at Hagerstown, Md., January 10, 1894.

In consideration of the high character of her husband and her father and of her limited resources the committee recommend the passage of the bill.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 405.

IN THE SENATE OF THE UNITED STATES.

MAY 14, 1894.—Ordered to be printed.

Mr. HAWLEY, from the Committee on Pensions, submitted the following

REPORT:

[To accompany S. 1956.]

The Committee on Pensions, to whom was referred the bill (S. 1956) granting an increase of pension to Mary Doubleday, widow of Bvt. Maj. Gen. Abner Doubleday, have had the same under consideration and submit the following report:

The applicant is the widow of the late Bvt. Maj. Gen. Abner Doubleday of the U. S. Army. He graduated from West Point in 1842 and was commissioned brevet second lieutenant. He served in the Mexican war, during which he was promoted to be first lieutenant. He was engaged in the battles of Monterey and Buena Vista. He was engaged in hostilities with the Apache Indians in 1854 and 1855 and with the Florida Indians from 1856 to 1858. He was second in command in Fort Sumter at the time of its first bombardment, on which occasion he aimed the first gun of the war on the side of the Union. In 1862 he was appointed brigadier-general of volunteers and assigned to the command of the defenses of Washington.

He was actively engaged in the following battles:

Battle of Groveton, August 28, 1862, where Doubleday's and Gibbon's brigades, after heavy losses on both sides, checked the advance of Stonewall Jackson's main army.

Second battle of Bull Run, August 29 and 30, 1862. On the second day, Gen. Hatch being wounded, Gen. Doubleday succeeded to the command of the division. He was directed by Gen. Hooker to hold the turnpike far in advance of the stone bridge, and did so until nightfall against the concentrated fire of the enemy's batteries.

Battle of South Mountain, September 10, 1862, in command of brigade.

Battle of Antietam, September 17, 1862. Gen. Doubleday, being again in command of a division, opened the battle. He lost heavily but captured 6 battle flags. For his services in this action he was brevetted lieutenant-colonel in the regular Army.

Battle of Fredericksburg, December 12 and 13, 1862. In this battle Gen. Doubleday, having been appointed major-general of volunteers, commanded a division of the First Corps, and successfully resisted the efforts of Jackson's cavalry and the concentrated fire of several batteries to turn the left flank of the Union Army.

His division was engaged in the second attack on Fredericksburg and in the battle of Chancellorsville. He commanded the First Corps of the Army and was prominently and actively engaged during each of the three days' fight at Gettysburg. For his brilliant and gallant services here he was brevetted colonel in the regular Army.

At the close of the war he was mustered out of the volunteer service and assumed his position as lieutenant-colonel in the regular Army, which dated from September 20, 1863.

In 1872, while on duty in Texas defending the frontier against Indian incursions, he was stung by a poisonous reptile. His health was seriously impaired, and as he had been more than thirty years in service he applied to be retired. He was offered an indefinite sick leave, but as he could not reconcile himself to receive full pay without rendering an equivalent he preferred to retire. He did so December 11, 1873, on the lineal rank of colonel.

Besides the brevets mentioned above, he was brevetted both a brigadier-general and a major-general in the regular Army, to date from March 13, 1865, his rank in the volunteer service having been that of a full major-general.

During the war for the Union and for many years afterward Gen. Doubleday carried a life-insurance policy, paying heavy extra premiums for the war risks. But the company became bankrupt. Mrs. Doubleday's resources are a pension of $50 a month and a small house partly paid for.

In consideration of her late husband's high character and very distinguished services the committee recommend the passage of the bill.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 408.

IN THE SENATE OF THE UNITED STATES.

MAY 16, 1894.—Ordered to be printed.

Mr. TURPIE, from the Committee on Foreign Relations, submitted the following

REPORT:

[To accompany S. 1703.]

The Committee on Foreign Relations, to whom was referred the bill (S. 1703) providing for the disposal of the accretions of the *Virginius* indemnity fund, beg leave to report as follows:

Under provisions of the treaty of February 11, 1871, with Spain to ascertain and settle the claims of citizens of the United States against the Government of Spain for injuries suffered by them, a special agreement was made between Minister Cushing and the Spanish minister for foreign affairs, of date February 27, 1875, relative to the *Virginius* indemnity fund.

Under this agreement Spain paid into the hands of the President of the United States, in three installments, a gross sum of $80,000, to be distributed, under the order and direction of the President, among the several claimants, citizens of this country, for damages in the *Virginius* case on account of injuries done to such of her crew and passengers as were proven to be citizens of the United States.

The completed payment of this sum in gross was made by Spain of date July 1, 1875. A considerable time elapsed from the date of this payment until the several claims for damages by our citizens had been adjusted and settled in such manner as to make a distribution of the fund.

The money paid had been during this time placed at interest in U. S. bonds and the expenditure and distribution of the amount of interest and premium accrued on this investment is the object of the pending bill.

The amount of this accretion according to the latest report of it made by Secretary Bayard, February 10, 1887, was $24,635.19.

The Government of the United States, as such, suffered no loss and made no claim for any damages on account of the capture of the *Virginius*.

The special agreement with Spain was entered into only on behalf of private citizens of the United States, or their legal representatives, who had suffered damage by reason of such capture. The *Virginius* was what is styled in the correspondence a rebel or pirate steamer, condemned in the courts of Cuba as such, whose passengers and crew were some of them imprisoned, others executed as being aiders and

abettors of the rebellion in Cuba, then being waged against the Spanish authority. Several of these passengers and of the crew were citizens of the United States, and thence the claims for damages arose.

The Spanish Government did not interfere in any manner with the adjudications of the Cuban courts, nor did it undertake to reimburse American citizens severally or particularly for wrongs claimed to have been done them by such adjudications, but it did agree to pay and did pay the sum above mentioned to enable the President of the United States to reimburse such of our citizens, the claimants, as he might determine were entitled to compensation for injuries suffered by them.

Your committee are of the opinion that the real owners of the fund are also the owners of the accretions thereof, unless there be something in the treaty or agreements of the parties to the transaction or in our own statutes making a different disposition of such accretions.

This fund has never been in the Treasury of the United States—the fund, with the accrued interest and premium thereon, remained in the custody of the Secretary of State, subject to the order of the President, and the accretions are subject to such disposition thereof as Congress may direct. The principal has been nearly all expended to claimants, but the interest and premiums accrued during the time in which the claims have been pending for proof and settlement is unexpended. There is no law directing the retention of this interest by the Government or by the President, and we therefore think that these accretions should follow the ordinary rule and be treated as a part of the principal. Neither the principal, nor the principal with its increment, will suffice to pay the full amount of the claims held to be valid and meritorious. A pro rata distribution among claimants is all that can be provided for.

It would be perhaps no violation of law or treaty or agreement that this Government should retain the accrued interest and premiums, and that we should direct them to be covered into the Treasury. Nevertheless we believe that it would be inequitable and unjust toward our own citizens that such a course should be taken. Such action would be equivalent to that of allowing a mere naked trustee to make some kind of profit or advantage out of the discharge of the duties of his trust.

It is true that a trustee may reimburse himself out of the fund for expenses of the trust. But in this case the expenses have been borne for the most part by the claimants themselves. They prepared and filed their claims and proofs in each instance. The only labor performed by our Government, or in behalf of the President, has been that of officials in the State Department, who have examined and passed upon the claims so presented. As all this has been done by officials already salaried for the performance of this and similar duties, it does not appear to us equitable that, as against its own citizens, the claimants, this Government should in any way or in any behalf recoup any part of the fund upon account of such service.

Your committee, therefore, favor the passage of the bill, with the following amendment:

Strike out the word "interest" in the title thereof and insert the word "accretions," as the increment of the fund arises from both interest and premium upon the bonds of the United States in which the principal was originally invested.

With this amendment your committee are of opinion that the bill should pass.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 409.

IN THE SENATE OF THE UNITED STATES.

MAY 16, 1894.—Ordered to be printed.

Mr. PALMER, from the Committee on Pensions, submitted the following

REPORT:

[To accompany H. R. 4720.]

The Committee on Pensions, to whom was referred the bill (H. R. 4720) granting a pension to Lucy Brown, dependent foster mother, have examined the same and report:

The report of the Committee on Invalid Pensions of the House of Representatives, hereto appended, is adopted and the passage of the bill is recommended.

HOUSE REPORT.

The Committee on Invalid Pensions, to whom was referred the bill (H. R. 4720) granting a pension to Lucy Brown, submit the following report:

The petitioner is the foster mother of Aaron B. Divinny who enlisted September 22, 1862, in Company B, Ninety-first Indiana Infantry, and died from a gunshot wound received in battle of Nashville, December 16, 1864, as shown by records of the War Department.

It is shown by evidence before the committee that this soldier's mother died in 1845, and his father in 1848, and immediately after, when the boy was 5 years of age, Josiah Brown took charge of him; the petitioner married said Josiah Brown February 1, 1849, and from that time cared for the soldier as a mother; she is now 68 years of age. It is also stated that the husband is 70 years of age, and unable by reason of age and kidney disease to perform manual labor and is without means of support.

Since the foregoing was written it has been established that the foster father, Josiah Brown, died February 1, 1894, leaving the beneficiary penniless, dependent, and feeble.

In accordance with the precedents of this committee and Congress the bill should be, and hereby is, favorably reported for passage.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 410.

IN THE SENATE OF THE UNITED STATES.

MAY 17, 1894.—Ordered to be printed.

Mr. TURPIE, from the Committee on Foreign Relations, submitted the following

REPORT:

[To accompany Senate resolution.]

Two memorials were referred to this committee upon the 14th of August, 1893, in regard to the traffic in firearms and intoxicants with the natives of the islands of New Hebrides by Europeans and Americans; concerning which, after due consideration thereof, the committee beg leave to submit the following report:

The New Hebrides are a group of islands in the South Pacific Ocean situated about 200 miles northeast of New Caledonia, well known as the site of the French penal colony in those waters.

The group consists of quite a number of islands, 16 or 18 of which are of considerable size. The native population is estimated at the number of 180,000. The area of the habitable islands is about 5,700 square miles.

The natives are a mixed race of the Milanesian and negro Papuan tribes, living for the most part in a wild and uncivilized condition. This condition has not changed much even during the one hundred and fifty years that they have been in contact with the commerce and civilization of the outer world. The only exception to this is found in the Christian native settlements, the colonies of the missionaries, where the converted natives are spoken of as leading a life of quiet industry and sobriety, and as steadily advancing in the arts and habits of civilization. The native Christian population is said to number 8,000 souls.

The labor of the missionaries in the conversion and improvement of the native population during later years is making quite substantial progress. It is charged, however, in the petition and resolutions laid before the committee that this beneficent work has been, and now is, much hindered and retarded by the sale to the natives by foreigners of intoxicating liquors and firearms, and it is alleged also in said papers, "that much of this traffic is carried on by this country," the United States. The white permanent settlements upon these islands are French and English; they are only visited by the people of the United States for commercial objects, except those of our citizens who have gone thither as teachers and missionaries.

The natives of these islands have no regular system of government. They are under the rule of independent native chiefs. There seems to be no general authority, either legislative or executive, which all acknowledge. They have nevertheless an autonomy, but it is so disintegrated, separate, and divided in its functions as to be somewhat

obscure, undefined, presenting great difficulties in the way of treaty or negotiation with the whole people. The French and English governments have both heretofore on different occasions found or deemed it necessary to interfere by military or naval force to protect the lives and property of their respective subjects living upon the islands.

The French Government in 1887 took formal possession of some of the islands by landing a military force thereon, but this action was remonstrated against by Great Britain in such terms that the occupation was declared to be only for a limited time and purpose. A convention for a joint naval commission was signed on November 16, 1887, and the French agreed to evacuate the islands within four months from that date. On January 26, 1888, the English and French representatives signed at Paris a declaration defining the functions and powers of the Anglo-French naval commission and establishing regulations for its guidance. The commission consists of a president and two British and two French naval officers. It is charged with the maintenance of order and the protection of the lives and the property of British and French citizens in the New Hebrides.

The presidency of the commission is to be held in alternate months by the commanders in chief of the British and French naval forces present in the group. The regulations provide that, in the event of a disturbance of peace and good order in any part of the New Hebrides where British or French subjects are found, or in the event of danger menacing their lines or property, the commission shall forthwith meet and take measures for repressing disturbance or protecting the interests endangered, not resorting to military force unless its employment is considered indispensable. If a military or naval force lands it must not remain longer than is deemed necessary by the commission. In a sudden emergency the British or French naval commanders nearest the scene of action may take measures for the protection of persons or property of either nationality, in concert, if possible, or separately when only one force is near the disturbed locality, but they must at once report to their senior officers, who shall communicate the report to each other and immediately summon the commission.

The commission has no power to interfere in disputes concerning titles to land, or to dispossess either natives or foreigners of lands that they hold in possession, but it is charged with the police duties of stopping the slave trade with the Kanakas and of preventing acts of piracy. The last of the French troops left the New Hebrides on March 15, 1888. This international convention between the two powers had been preceded by and accompanied with quite prolonged negotiations between them as to the subject of the prohibition of the sale of intoxicants and fire arms to the natives of the New Hebridean islands.

It appears from our report upon foreign relations for 1892–'93 that these negotiations had been submitted, or at least communicated, to our Department of State. Secretary Foster, in a letter of date November 18, 1892, tendered the assistance and good offices of this Government in aid of this movement. On the 4th day of July, 1892, the British Government, through its legation at Washington, had submitted a draft of a proposed international agreement to be entered into by the principal powers concerning this traffic (F. R., 1892, p. 287). On the 11th of October, 1892, Mr. Foster, our Secretary of State, sent an official dispatch to the minister of Great Britain, in which he assured him—

> That this Government looks with favor upon any humanitarian work, and would like further information as to the scope and form of the proposed agreement.

But at the same time Secretary Foster also said—

> While the sentiments and convictions of this Government indorse restrictions of deleterious commerce with the native Pacific islanders, the method of giving expression thereto is necessarily influenced by the disparity of policy and interests between the United States and the great European States in the Pacific Ocean.

The Secretary at the same time intimates that when such method of expression has been generally acquiesced in by the powers more immediately interested, the United States may become a party thereto. Here, so far as the record at present shows, negotiations paused.

Under these circumstances and conditions your committee cordially indorses the offer of this Government to cooperate with other powers in prohibiting this traffic with the natives of the New Hebrides.

In the present autonomous but somewhat irregular political status of the native system of government, it is obvious that only external treaty regulations will avail to prevent this traffic and that such regulations must be joint and cooperative in their methods to be effective.

The committee, therefore, are of the opinion that the kindly offices of this Government should be continuously tendered in aid of such cooperation until an international agreement be concluded, which shall finally prevent and prohibit this traffic, so destructive to the moral and physical well-being of the natives of the New Hebrides; and with the hope that this may at an early day be accomplished, we ask that we may be discharged from present further consideration of the petition and resolutions. And the committee do now present the accompanying resolution on this subject to the Senate and request favorable consideration thereof and do recommend its adoption.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 411.

IN THE SENATE OF THE UNITED STATES.

MAY 17, 1894.—Ordered to be printed.

Mr. MANDERSON, from the Committee on Printing, submitted the following

REPORT:

[To accompany H. R. 7072, to amend section 3816 of the Revised Statutes, relating to advances made to the Public Printer.]

The Committee on Printing, to whom was referred the accompanying House bill, having considered the same, report it back without amendment and recommend that it do pass.

This amendment is necessary in order that the Public Printer may be enabled to meet promptly all the current expenses of the office. It is identical with a provision in the general printing bill, which has passed the Senate once and the House of Representatives twice, and is now pending before this committee.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 414.

IN THE SENATE OF THE UNITED STATES.

MAY 17, 1894.—Ordered to be printed.

Mr. FAULKNER, from the Committee on Territories, submitted the following

REPORT:

[To accompany H. R. 352.]

The Committee on Territories, to whom was referred the bill (H. R. 352) to enable the people of Utah to form a constitution and State government and be admitted into the Union on an equal footing with the original States, after full consideration of said House bill, unanimously recommend the admission of the Territory of Utah as a State and favorably report said bill (H. R. 352) with the following amendments:

In section 2 strike out all after the word "shall" in line 29 down to and including the word "thereof" in line 34, and insert "on the first day of August, eighteen hundred and ninety-four, issue a proclamation ordering an election of the delegates aforesaid in said Territory to be held on the Tuesday next after the first Monday in November following."

Amend section 3 by striking out the word "third" in line 3 and inserting "first," and by striking out in same line the words "after their election" and inserting "in March, eighteen hundred and ninety-five."

Amend section 4 by striking out in line 6 the words "at a time fixed in said ordinance" and inserting "on the Tuesday next after the first Monday in November, eighteen hundred and ninety-five."

Your committee would accompany this recommendation with the full and exhaustive reports presented to the House of Representatives to accompany this act by the Hon. Mr. Wheeler and the Hon. Mr. Kilgore, which two reports present all the facts bearing upon the propriety of the admission of the Territory of Utah as a State.

House Report No. 162, Fifty-third Congress, First Session.

Mr. KILGORE, from the Committee on the Territories, submitted the following

REPORT:

[To accompany H. R. 352.]

Your committee, to whom was referred the bill (H. R. 10190) entitled "A bill to enable the people of Utah to form a constitution and State government, and to be admitted into the Union on an equal footing with the original States," have had the same under consideration and respectfully report as follows:

On January 4, 1893, President Harrison issued the following:

BY THE PRESIDENT OF THE UNITED STATES OF AMERICA.

A PROCLAMATION.

Whereas Congress, by a statute approved March 22, 1882, and by statutes in furtherance and amendment thereof, defined the crimes of bigamy, polygamy, and unlawful cohabitation in the Territories and other places within the exclusive jurisdiction of the United States, and prescribed a penalty for such crimes; and

Whereas on or about the 6th day of October, 1890, the Church of the Latter Day Saints, commonly known as the Mormon Church, through its president, issued a manifesto proclaiming the purpose of said church no longer to sanction the practice of polygamous marriages, and calling upon all members and adherents of said church to obey the laws of the United States in reference to said subject-matter; and

Whereas it is represented that since the date of said declaration the members and adherents of said church have generally obeyed said laws and have abstained from plural marriages and polygamous cohabitation; and

Whereas by a petition dated December 19, 1891, the officials of said church, pledging the membership thereof to a faithful obedience to the laws against plural marriages and unlawful cohabitation, have applied to me to grant amnesty for past offenses against said laws, which requests a very large number of influential non-Mormons residing in the Territories have also strongly urged; and

Whereas the Utah Commission, in their report bearing date September 15, 1892, recommend that said petition be granted and said amnesty proclaimed, under proper conditions as to the future observance of the law, with a view to the encouragement of those now disposed to become law-abiding citizens; and

Whereas during the past two years such amnesty has been granted to individual applicants in a very large number of cases, conditioned upon the faithful observance of the laws of the United States against unlawful cohabitation, and there are now pending many more such applications; now,

Therefore, I, Benjamin Harrison, President of the United States, by virtue of the powers in me vested, do hereby declare and grant a full amnesty and pardon to all persons liable to the penalties of said act by reason of unlawful cohabitation under the color of polygamous or plural marriage, who have since November 1, 1890, abstained from such unlawful cohabitation; but on the express condition that they shall in future faithfully obey the laws of the United States hereinbefore named, and not otherwise.

Those who shall fail to avail themselves of the clemency hereby offered will be vigorously prosecuted.

In witness whereof I have hereunto set my hand and caused the seal of the United States to be affixed.

Done at the city of Washington this fourth day of January in the year of our Lord one thousand eight hundred and ninety-three, and of the Independence of the United States the one hundred and seventeenth.

[SEAL.] BENJAMIN HARRISON.

By the President:

JOHN W. FOSTER,
Secretary of State.

DISCONTINUANCE OF POLYGAMY.

The manifesto referred to by the President in his amnesty proclamation was issued by the president of the Mormon Church on September 25, 1890. This is the manifesto:

To whom it may concern:

Press dispatches having been sent for political purposes from Salt Lake City, which have been widely published, to the effect that the Utah Commission, in their recent report to the Secretary of the Interior, allege that plural marriages are still being solemnized, and that forty or more such marriages have been contracted in Utah since last June or during the past year; also that in public discourses the leaders of the church have taught, encouraged, and urged the continuance of the practice of polygamy,

I, therefore, as president of the Church of Jesus Christ of Latter Day-Saints, do hereby, in the most solemn manner, declare that these charges are false. We are not teaching polygamy, or plural marriage, nor permitting any person to enter into its practice, and I deny that either forty or any number of plural marriages have during that period been solemnized in our temples or in any other place in the Territory.

One case has been reported in which the parties alleged that the marriage was performed in the endowment house, in Salt Lake City, in the spring of 1889, but I have not been able to learn who performed the ceremony. Whatever was done in the matter was without my knowledge. In consequence of this alleged occurrence the endowment house was, by my instructions, taken down without delay.

Inasmuch as laws have been enacted by Congress forbidding plural marriages, which laws have been pronounced constitutional by the court of last resort, I hereby declare my intention to submit to those laws, and to use my influence with the members of the church over which I preside to have them do likewise.

There is nothing in my teachings to the church or in those of my associates, during the time specified, which can be reasonably construed to inculcate or encourage polygamy, and when any elder of the church has used language which appeared to convey any such teaching he has been promptly reproved, and I now publicly declare that my advice to the Latter-Day Saints is to refrain from contracting any marriage forbidden by the laws of the land.

WILFORD WOODRUFF,
President of the Church of Jesus Christ of Latter-Day Saints.

On the 6th day of October, 1890, eleven days after the manifesto was issued, the church met in general conference. It is estimated that from ten to fifteen thousand people were present. Every quorum and council of the church, from the first presidency and twelve apostles down to the least authority in the church, were represented. There were officers and members present from every stake in Utah, and from all the country round about. This manifesto was read to that assembly, and Lorenzo Snow, the president of the council of apostles, the next highest authority in the church to the first presidency, made the following motion, which was unanimously adopted:

I move that, recognizing Wilford Woodruff as the president of the Church of Jesus Christ of Latter-Day Saints, and the only man on the earth at the present time who holds the keys of the sealing ordinances, we consider him fully authorized by virtue of his position to issue the manifesto which has been read in our hearing and which is dated September 25, 1890, and that as a church in general conference assembled, we accept his declaration concerning plural marriage as authoritative and binding.

Referring to this manifesto in his message to the Secretary of the Interior for the year 1891, the governor of Utah says:

I have no doubt that, as they have been led to believe it was put forth by divine sanction, it will be received by the members of the Mormon Church as an authoritative rule of conduct, and that, in effect, the practice of polygamy is formally renounced by the people.

One year after, the church spoke again on this important subject. On October 6, 1891, the first presidency of the church made the following official declaration to the conference, which was unanimously indorsed by the vast assemblage present:

Concerning the official report of the Utah Commission made to the Secretary of the Interior, in which they allege, "During the past year, notwithstanding the 'manifesto,' reports have been received by the Commission of eighteen male persons who, with an equal number of females, are believed to have entered into polygamous marriages" during the year, we have to say it is utterly without foundation in truth. We repeat in the most solemn manner the declaration made by President Wilford Woodruff at our general conference held last October, that there have been no plural marriages solemnized during the period named.

Polygamy or plural marriage has not been taught, neither has there been given permission to any person to enter into its practice, but, on the contrary, it has been strictly forbidden.

WILFORD WOODRUFF,
GEORGE Q. CANNON,
JOSEPH F. SMITH,
First Presidency of the Church of Jesus Christ of Latter-Day Saints.

PETITION FOR AMNESTY.

The petition for amnesty referred to by the President in his proclamation is as follows:

SALT LAKE CITY, *December 19, 1891.*

To the PRESIDENT:

We, the First Presidency and Apostles of the Church of Jesus Christ of Latter-Day Saints, beg respectfully to represent to your excellency the following facts:

We formerly taught to our people that polygamy, or celestial marriage, as commanded by God through Joseph Smith, was right; that it was a necessity to man's highest exaltation in the life to come.

That doctrine was publicly promulgated by our president, the late Brigham Young, forty years ago, and was steadily taught and impressed upon the Latter-Day Saints up to a short time before September, 1890. Our people are devout and sincere, and they accepted the doctrine, and many personally embraced and practiced polygamy.

When the Government sought to stamp the practice out, our people almost without exception remained firm, for they, while having no desire to oppose the Government in anything, still felt that their lives and their honor as men were pledged to a vindication of their faith; and that their duty toward those whose lives were a part of their own was a paramount one, to fulfill which they had no right to count anything, not even their own lives, as standing in the way. Following this conviction, hundreds endured arrest, trial, fine, and imprisonment, and the immeasurable suffering borne by the faithful people no language can describe. That suffering, in abated form, still continues.

More, the Government added disfranchisement to its other punishments for those who clung to their faith and fufilled its covenants.

According to our faith the head of our church receives from time to time revelations for the religious guidance of his people.

In September, 1890, the present head of the church, in anguish and prayer, cried to God for help for his flock, and received the permission to advise the members of the Church of Jesus Christ of Latter-Day Saints that the law commanding polygamy was henceforth suspended.

At the great semi-annual conference, which was held a few days later, this was submitted to the people, numbering many thousands and representing every community of the people in Utah, and was by them in the most solemn manner accepted as the future rule of their lives.

They have since been faithful to the covenant made that day.

At the late October conference, after a year had passed by, the matter was once more submitted to the thousands of people gathered together, and they again in the most potential manner ratified the solemn covenant.

This being the true situation, and believing that the object of the Government was simply the vindication of its own authority and to compel obedience to its laws, and that it takes no pleasure in persecution, we respectfully pray that full amnesty may be extended to all who are under disabilities because of the operations of the so-called Edmunds and Edmunds-Tucker laws. Our people are scattered; homes are made desolate; many are still in prison; others are banished or in hiding. Our hearts bleed for these. In the past they followed our counsels, and while they are thus afflicted our souls are in sackcloth and ashes.

We believe there are nowhere in the Union a more loyal people than the Latter-Day Saints. They know no other country except this. They expect to live and die on this soil.

When the men of the South, who were in rebellion against the Government in 1865, threw down their arms and asked for recognition along the old lines of citizenship, the Government hastened to grant their prayer.

To be at peace with the Government and in harmony with their fellow citizens who were not of their faith, and to share in the confidence of the Government and people, our people have voluntarily put aside something which all their lives they have believed to be a sacred principle.

Have they not the right to ask for such clemency as comes when the claims of both law and justice have been fully liquidated?

As shepherds of a patient and suffering people we ask amnesty for them and pledge our faith and honor for their future.

And your petitioners will ever pray.

WILFORD WOODRUFF.	H. J. GRANT.
GEORGE Q. CANNON.	JOHN HENRY SMITH.
JOSEPH F. SMITH.	JOHN W. TAYLOR.
LORENZO SNOW.	M. W. MERRILL.
FRANKLIN D. RICHARDS.	ANTHON H. LUND.
MOSES THATCHER.	ABRAHAM H. CANNON.
FRANCIS M. LYMAN.	

OFFICIAL INDORSEMENTS.

This petition was accompanied by the following letter from Governor Thomas and Chief-Justice Zane. It was also indorsed by members of the Utah Commission and by all the Federal judges of Utah, besides other prominent non-Mormons. The governor and chief justice say:

SALT LAKE CITY, UTAH, *December 21, 1891.*

To the PRESIDENT:

We have the honor to forward herewith a petition signed by the president and most influential members of the Mormon Church. We have no doubt of its sincerity, and no doubt that it is tendered in absolute good faith. The signers include some who were most determined in adhering to their religious faith, while polygamy, either mandatory or permissive, was one of its tenets, and they are men who would not lightly pledge their faith and honor to the Government or subscribe to such a document without having fully resolved to make their words good in letter and spirit.

We warmly recommend a favorable consideration of this petition, and if your excellency shall find it consistent with your public duties to grant the relief asked, we believe it would be graciously received by the Mormon people and tend to evince to them, what has always been asserted, that the Government is beneficent in its intention, only asks obedience to its laws, and desires all law-abiding citizens to enjoy all the benefits and privileges of citizenship. We think it will be better for the future, if the Mormon people should now receive this mark of confidence.

As to the form and scope of a reprieve or pardon, granted in the exercise of your constitutional prerogative, we make no suggestion. You and your law advisers will best know how to grant what you may think should be granted.

We are, very respectfully,

ARTHUR L. THOMAS,
Governor of Utah.
CHARLES S. ZANE,
Chief Justice of Utah Territory.

The governor of Utah in his report for 1892 states as follows (see p. 50):

On December 18, 1891, there was placed in my hands the following petition for amnesty, signed by the president of the Mormon Church and his two councilors and all the apostles of the church in this country at the time

It seemed to me it was the most important document which the Government had received from the officers of the Mormon Church. It was a distinct, unqualified pledge that for the future the Mormon Church and people would loyally observe and uphold the law. After consultation with Chief-Justice Zane we agreed to transmit the petition to Washington with the letter that follows the petition. Subsequently Judges Miner, Blackburn, and Anderson, of the Territorial supreme court, Secretary Elijah Sells, and Utah Commissioners Godfrey, Saunders, and Robertson joined in the recommendation.

MEMORIAL OF LEGISLATURE.

In January, 1892, the legislative assembly of the Territory of Utah presented the following petition to Congress:

To the honorable the Senate and House of Representatives of the United States of America in Congress assembled:

We, your petitioners, the legislative assembly of the Territory of Utah, respectfully represent:

Utah contains an aggregate wealth of more than $200,000,000. The proceeds of her farms, live stock, mines, and manufactures for the year 1890 amounted to $23,000,000.

She has near a quarter of a million of civilized people, who, in point of intelligence, industry, and all the essential qualities of good citizenship, are up to the standard of any American community. Polygamy, once practiced by a small portion of her people, has yielded to the supremacy of the law, a sense of the evils flowing from it, and of the utter futility of further attempting to maintain an institution obnoxious to general public sentiment.

In the midst of wonderful material progress her people have recently turned their attention to the study of questions of government and legitimate politics, and are espousing the cause of one or the other of the national parties.

These new conditions have come naturally, honestly, and for the future are absolutely secure. A patriotic people are pledged to their preservation. Retrogression, involving as it would dishonor and dire misfortune, is impossible.

Utah, in the feelings of her people, has been lifted from her humiliation and disgrace. To-day she is imbued with the hope and determination to be free—free in the full sense of American constitutional freedom; which means something more than liberty permitted; which consists in civil and political rights absolutely guarantied, assured, and guarded in one's liberties as a man and a citizen—his right to vote, his right to hold office, his equality with all others who are his fellow citizens, all these guarded and protected, and not held at the mercy and discretion of one man, or popular majority, or distant body unadvised as to local needs or interests.

The governor, the secretary, the members of the judiciary (except justices of the peace), the marshal, the public prosecutor and his assistants, the board of commissioners appointing all registration and election officers and controlling the elections, are selected by a distant appointing power, and are utterly unaccountable to the people for the manner in which they perform the duties of their offices.

The governor nominates the auditor of public accounts, treasurer, the governing boards of all public institutions, such as the university, agricultural college, reform school and insane asylum. Thus the people have no voice in the selection of persons to manage their public funds and institutions created and maintained at their expense. The Territorial school commissioner is selected by the supreme court and owes no responsibility to the people.

Clerks selected by the district judges, and the probate judges, appointed by the President and with the advice of the Senate, select the regular panels for jurors. The regular panel is supplemented by persons summoned at the discretion of the United States marshal. The determination of rights of life, liberty, and property rests with tribunals, no part of which owe any accountability to those most vitally concerned in the faithful performance of their duties. The marshal and his deputies are clothed with the most far-reaching authority, under which they may usurp the functions of all the local constabulary and police of the Territory. Even the justices of the peace are shorn of their limited jurisdiction by commissioners appointed by the supreme court and whose jurisdiction is made coextensive with that of such justices.

The will of the representatives of the people in the enactment of needed legislation is liable to be defeated at the caprice of a gubernatorial autocrat clothed with the power of absolute veto.

While the county prosecuting attorneys, elected by the people, are permitted to initiate prosecutions in the inferior courts, no such prosecution can be carried forward to success except according to the pleasure of the district attorney imposed upon the people from abroad.

The most vicious interference with the vestige of our local liberties is the maintenance and action of the Utah Commission, who, in their appointment of registration officers, have often selected corrupt and irresponsible persons. They have filled the registration lists with fictitious names and resorted to other devices by which repeating and other frauds might be successfully perpetrated at elections.

There is no province or dependency, it is believed, of any civilized nation wherein the people are not accorded more of liberty and the rights of man than are possessed by American citizens in Utah.

The situation is intolerable to freemen. The people, through us, their chosen but helpless representatives, demand relief. The officeholders, their patrons, those who fatten upon the degradation and misfortune of our people, all the hordes of the beneficiaries of the present system will resist the appeal. * * *

Your memorialists further ask that, as all essential conditions exist entitling Utah to admission into the Union as a State, and that as soon as your honorable body is satisfied of this fact, a law may at once be enacted permitting her to take the position for which she is so eminently fitted.

And your memorialists will ever pray, etc.

POLITICAL ACTION.

At the Republican Territorial convention held in the fall of 1892 the following resolutions were adopted:

We recall the policy of the national Republican party that: "The government by Congress of the Territories is based upon necessity only, to the end that they may become States in the Union. Therefore, whenever the condition of the population, material resources, public intelligence, and morality are such as to insure a stable local government therein, the people of the Territory should be permitted, as a right inherent in them, to form for themselves constitutions and State governments, and be admitted into the Union."

We again deny that the Republican party in Utah was organized to unduly hasten statehood. The question of statehood for Utah was not immediately involved in the division of the people of the Territory on national party lines; but, in view of the many changes which have recently transpired in our midst affecting the political interests of the people and believing the conditions of the population, material resources, public intelligence, and morality of this Territory are such as to insure a stable local government therein, we pledge to the people of this Territory that our best efforts shall be exerted to form a State government for Utah and to procure her admission into the Union of States.

And about the same time the Democratic Territorial convention adopted the following resolutions:

Eleventh. We announce our complete confidence in the sincerity of the Mormon people in their abandonment of polygamy, in submission to the laws of the land, and their division on party lines, and our full faith in the pledges of their church leaders that the freedom of the members in political affairs shall not be interfered with by them in any particular. We view the attempts of individuals to make it appear that the Mormon presidency secretly desire and work for the success of any particular party as a slander upon those church officials and a disgrace to those engaged in such despicable trickery.

Twelfth. We emphatically declare that Utah is fully prepared in every way for the honors and responsibilities of a sovereign State, and pledge ourselves to labor unceasingly until this proud position is achieved.

The Republican party in its platform adopted at Minneapolis June 9, 1892, declares as follows:

We favor the admission of the remaining Territories at the earliest possible date, having due regard for the interests of the people of the Territories and of the United States.

And in the national platform of the Democratic party adopted at Chicago on June 22, 1892, in section 18, it is declared:

We favor the early admission of all the Territories having the necessary population and resources to admit them to statehood.

When we remember that Utah has a population of 225,000 people and property of an assessed valuation of over $100,000,000, and of a

real value of not less than $200,000,000, being a population and wealth far exceeding that of any Territory, except South Dakota, that has ever been admitted into the Union as a State, it is and must be evident to all that the only barrier in all the past to the admission of Utah as a State was that of polygamy.

POLYGAMY EXTERMINATED.

While your committee utterly condemn the doctrine of polygamy, and hold that so long as the Mormons constituted the larger part of the population of the Territory of Utah, and personally or as a matter of faith, with or without the practice, believed in the doctrine of polygamy, then it was proper and right for the Federal Government to use all of its vast powers to secure the overthrow and destruction of that practice; yet, in view of the foregoing facts set forth in this report, as well as the concurrent testimony of all parties interested in the welfare of Utah who have appeared before your committee at its hearings upon this subject during the present Congress, as well as the vast amount of testimony submitted to your committee during the Fiftieth Congress upon the same topics, compel your committee to believe without doubt or hesitation that the institution of polygamy as taught by the Mormon Church, whether of faith or of practice, is now absolutely stamped out and exterminated.

CHARACTER OF MORMON PEOPLE.

Your committee, in regard to the general character of the Mormon people for thrift, honesty, morality, sobriety, and virtue, other than their disputed doctrine of polygamy, call attention to the following statements and excerpts of evidence produced to your committee:

The Mormon Church will be 63 years old on the 6th day of April, 1893. Polygamy was not taught or proclaimed in the Book of Mormon. The church long existed without polygamy, and was about 23 years old when the revelation of polygamy was promulgated; two of the three original witnesses to the translation of the Book of Mormon seceded from the church after it had adopted polygamy, and upon that account. The revelation concerning it was first made public in 1852, and published in the book of "Doctrines and Covenants" in 1853. Let us now see what are the general characteristics of the Mormon people under the teachings of their religion.

The Hon. Charles S. Zane is the chief justice of Utah Territory and is a Republican in politics.

Chief-Justice Zane was interviewed recently on the subject of the Teller enabling act for Utah. He said:

My views as to the bill for an enabling act for Utah Territory, introduced into the United States Senate yesterday by Senator Teller, are that I am for the passage of the bill, without any mental reservation. I further state unhesitatingly that it is my opinion that the Republican party of Utah should declare in favor of its passage and insist upon it becoming a law. The Church of Jesus Christ of Latter-Day Saints has taken a stand against the practice of polygamy, and I have no doubt that its members desire to coöperate with the non-Mormons politically for the common good. If Utah becomes a State the Mormons will understand that their material and political interests, their welfare and happiness, are so related to and connected with those of the Gentiles that laws benefiting the latter will be good for the former, and such laws as oppress and injure the one class will be detrimental to the other.

More than 200,000 people in Utah are building its cities, opening and working its mines of incalculable wealth, improving and cultivating vast numbers of productive and valuable farms, and herding their flocks in its valleys and upon its hills. Com-

paratively speaking, these people are temperate, industrious, and honest. They are sufficient in numbers and possess the requisite wealth and intelligence to be admitted into the sisterhood of States. I say let statehood come. The "Mormon" scare has blown over. I am unable to see under statehood the alarming apparitions and hobgoblins conjured up by timidity and fear or by prejudice. The time has come to abandon the enmities, the contention, and prejudice of the past and to lay the foundation of the State of Utah deep and sure upon civil and religious liberty—upon the great principle of equality before the law. We are yet at the foot of the hill, the summit of which will be scaled in distant ages through generations of progress and prosperity. The people of Utah, with the citizens of the United States in other parts of its wide borders, are entitled to national sovereignty, and to those powers delegated by the Constitution of the United States to the Federal Government, and to State sovereignty as to those powers not so delegated. I am for statehood according to the provisions of the Teller bill, so far as they have been reported to me.

Hon. F. H. Dyer was a Democrat and was marshal of the Territory under President Cleveland. In his testimony before your committee in 1892 he gave the following evidence:

Mr. CAINE. What is your experience, as a business man, in regard to the financial standing of the Mormons; how are they regarded in financial circles? What are their notes worth?

Mr. DYER. One hundred cents on the dollar. I want to say that I do not believe that the most radical anti-Mormon will charge that any Mormon was ever derelict in his business obligations. They are always true to those. They regard their word as their bond. It has never been charged to the contrary. In their business relations they are as high-toned and honorable as it is possible for any people to be. They stand on their honor in those matters better than any people I know.

The CHAIRMAN. You say that you lived there sixteen years?

Mr. DYER. Yes, sir; it will be sixteen years next month.

The CHAIRMAN. The question I was about to ask is this: Considering that polygamy is abolished, and that the violation of the law is at an end, are those people not as competent, and as deserving, and as capable of self-government as the people in any other part of the United States?

Mr. DYER. I am pretty well acquainted with the people of Mississippi; I know them as well as I know any people under the sun; and I think the people of Utah are just as loyal to this country as the people of Mississippi, and just as capable of self-government as the people among whom I was raised.

The CHAIRMAN. And you think their professions are to be relied upon just as well? That is, they say they have abandoned the practice, and you think they are sincere?

Mr. DYER. I believe they are sincere. Of course, when this party was first organized—the church party—they were then banded together in defense of the church, and at that time I am satisfied that they would have done most anything which was in the interest of the church; but there has been a leaven at work within that period; the younger element are desirous of being free and have separated from the church party finally, which has resulted in its dissolution.

Governor Stephenson, of the Territory of Idaho, in his official report to the Secretary of the Interior, of date of October 20, 1888, speaking of the Mormons within the Territory of Idaho, says:

Paris has a population of about 1,500, all Mormons, and there is not a saloon or gambling house, or any other place where intoxicating liquor is sold, and this is, I am told, the case in all the towns in Idaho where these people have exclusive control.

In traveling through the Mormon settlements one is at once struck with their improvements and the certainty that they are persevering and industrious; their country towns and villages are thrifty, and their farms well cultivated. Their buildings are generally substantial, and many of them stylish, with all the modern improvements that make a country look progressive and prosperous; and I believe these people are, as a rule, frugal, industrious, and honest.

Bayard Taylor, the celebrated traveler, lecturer, and writer, says:

We must admit that Salt Lake City is one of the most quiet, orderly, and moral places in the world. There are few Gentile liquor saloons, but the Mormons, as a people, are the most temperate of Americans. They are chaste, laborious, and generally cheerful; and what they have accomplished in so short a time, under every circumstance of discouragement, will always form one of the most remarkable chapters in our history. The Territory does not owe a dollar; the people have established manufactories, built roads and bridges, irrigated wastes of sagebrush, colonized the

basin of the interior desert for an extent of 500 miles, and made a nucleus of permanent civilization in the most forbidding part of the continent.

Dr. Miller, of the Omaha Herald, writes as follows:

One feature of the influx into this hitherto quiet, sober, moral, and intelligent Mormon community carries with it its own comment to the thoughtful. To the lasting honor of the Mormon people and system be it said that for twenty-five years such machines of moral infamy as whisky shops, harlotries, faro banks, and all the attendant forms of vice and iniquity were totally unknown in Utah. It can not be denied that the Mormons have achieved victories and conquests over the most gigantic evils that curse our race, and which are to-day the chief banes of every civilized State. Already the hydra-headed monsters of infamy are gaining footholds in Salt Lake City. The gambler and woman of the town are there. The damning fact, so creditable to Mormon morality, is that it is only by the surreptitious evasion and overthrow of Mormon authority that these and kindred curses now invade the beautiful city of Salt Lake.

Elder Miles Grant, the adventist and editor of the World's Crisis, says:

After a careful observation for some days, we came to the settled conclusion that there is less licentiousness in Salt Lake City than in any other one of the same size in the United States, and were we to bring up a family of children in these last days of wickedness we should have less fears of their moral corruption were they in that city than in any other. Swearing, drinking, gambling, idleness, and licentiousness have made but small headway there when compared with other places of equal size. As a body they are a very sincere people and believe the Lord led them there. They are close Bible students, and are very familiar with the Old Testament prophecies, upon which they dwell much in their preaching. Among them are a number of able men, who are capable of entertaining an intelligent audience. They preach without notes and present such thoughts as come to them on the occasion.

Mrs. Emily Pitt Stevens, editor Pioneer, a woman's journal, writes as follows:

Utah wants to assume the prerogative of State sovereignty. She has population and wealth superior to any other Territory, and why should she not enjoy the privilege of self-government? Utah is the wisest and best governed of any large section of people in the United States. In Great Salt Lake City there is less of rowdyism, drunkenness, gambling, idleness, theft, conspiracy against the peace of society, and crime generally than there is in any other city of the same population in the country, if not on the globe.

Chief-Justice White, in charging the grand jury, Salt Lake City, February, 1876, said:

This land they have redeemed from sterility, and occupied its once barren solitudes with cities, villages, cultivated fields, and farmhouses, and made it the habitation of a numerous people, where a beggar is never seen and almshouses are neither needed nor known. These are facts and accomplishments which any candid observer recognizes and every fair mind admits.

POPULATION.

The Territory of Utah possesses in a marked degree those requirements essential to statehood, "the necessary population and resources."

The census of 1890 places the population of Utah at 207,905, which is 15,041 more than the combined population of the States of Montana and Wyoming, and 17,054 in excess of the entire population of the adjoining States, Nevada, Idaho, and Wyoming, and 34,004 more than required under the census of 1890 for a Representative in Congress.

The population has greatly increased since the census was taken. The governor of the Territory in his report to the Secretary of the Interior, dated October 1, 1892, estimates the population at 223,930, being an increase of 16,025 over the census report. This is deemed a very

conservative estimate, and the population to-day may be safely placed at 225,000.

Of the 207,905 inhabitants given by the census report, there were:

Males	110,463
Females	97,442
Excess of males	13,021

The population of the Territory has a steady growth, by immigration from other States and foreign countries, but more especially by births. The census reports give the following facts:

Between the ages of 5 and 17 years	67,465
Native born	62,463
Foreign born	5,002
Between the ages of 18 and 20 years	12,472
Native born	10,519
Foreign born	1,953
Males between ages of 5 and 20 years	40,498
Females between ages of 5 and 20 years	39,439
Total	79,937
Total males of voting age	54,471

The idea often expressed by persons ignorant of the facts, that the people of Utah are mostly foreigners is most successfully refuted by the census reports, which make the following showing:

Total American born	154,841
Total foreign born	53,064

The proportion of foreign born to American born in Utah is less than in the States of North Dakota, Minnesota, Montana, Nevada, Wisconsin, Rhode Island, California, Massachusetts, South Dakota, New York, Michigan, Washington, and the Territory of Arizona.

Only in three States and one Territory has the foreign population decreased more than in Utah during the last census decade.

The percentage of aliens who speak the English language is greater in Utah than in thirty-two States and two Territories.

The population of Utah consists largely of the white element, there being of colored persons, embracing civilized Indians, Chinese, Japanese, and Hawaiians as well as Negroes only 2,006 in the entire Territory; less in proportion to the whites than any of the Pacific States and Territories.

The total number of votes cast at the election for Delegate held in November, 1892, was 34,577, being an increase of 10,812 over the election for members of the legislature held the year previous.

WEALTH AND RESOURCES.

Utah has all the elements of greatness within its borders. Its resources being varied, diversified industries flourish and the future gives promise of wonderful results. The splendid system of irrigation which has been provided largely by community coöperation, renders crops certain, and assures food supplies at cheap rates.

AGRICULTURE.

The agricultural interests of the Territory have always been considered of paramount importance, the greater number of the old settlers being farmers and stock-raisers. The governor in his report for 1891, places the value of agricultural products, including wheat, rye, oats, barley, corn, potatoes, beets, hay, alfalfa, orchard fruits, vinegar, vegetables, cotton, wool, butter, cheese, dried fruits, honey, sorghum, wine, and cider, as reported by the county assessors, at $10,218,527.28.

From the census returns of 1890, we learn that in Utah the total area in cereals in 1889 was 122,878 acres. The production of cereals for the year 1889, embracing barley, buckwheat, Indian corn, oats, rye, and wheat, amounted to 2,395,744 bushels.

IRRIGATION.

The census reports of 1890 furnish the following relative to irrigation in Utah:

In Utah crops were raised by irrigation in the census year ended June 30, 1890, on 263,473 acres, or 411.68 square miles, a trifle over five-tenths of 1 per cent of the entire area of the territory. The aggregate number of farms was 10,757, and of these 9,724, or about nine-tenths, depended upon irrigation, the remaining tenth being either stock ranches or farms in the northern end of the Territory, where the climate is less arid, or situated so high in the mountains that crops can be raised by what is known as "dry farming."

The average size of irrigated farms, or, rather, of irrigated portions of farms, was 27 acres. In this connection the term "irrigated farm" is used to include only the area on which crops were raised by irrigation, the uncultivated portions of such farms not being taken into account. With this understanding, irrigated farms have been classified as follows: 5 irrigated farms of 640 acres or upward; 13 of from 320 to 640 acres; 65 of from 160 to 320 acres. These 83 farms contained an average of 312 acres each, and had a total area of 25,857 acres, or nearly 10 per cent of the entire amount watered in the Territory. The remaining 9,641 farms, under 160 acres in size, comprised over 90 per cent of the total irrigated area, and averaged 25 acres each.

Average value of products per acre, $18.03.

The Territory has about 3,000 miles of irrigating canals.

LIVE STOCK.

The governor's report for 1892 gives the following statistics relative to the stock industry of the Territory:

Number of horses and mules	87,457
Assessed valuation of horses and mules	$3,084,473
Number of cattle	255,675
Assessed valuation of cattle	$3,000,372

The number of sheep in Utah, according to statistics furnished by the United States Agricultural Department for 1892, was 2,800,000, which, at an average valuation of $2, amounts to $5,600,000.

The wool clip for 1892 is estimated at 13,500,000 pounds; valued at 16 cents per pound would amount $2,160,100.

MINING INDUSTRY.

The following tables are from the governor's report for 1892:

Statement showing value and amount of the principal mineral products of Utah from 1879 to 1891, both inclusive.

	Refined lead.		Unrefined lead.	
	Amount.	Value.	Amount.	Value.
	Pounds.		*Pounds.*	
1879	2,301,276	$103,557.42	26,315,359	$592,095.57
1880	2,892,498	144,624.90	25,657,643	641,444.75
1881	2,645,373	145,495.51	38,222,185	955,554.62
1882	8,213,798	410,690.00	52,349,850	1,361,096.00
1883	3,230,547	161,527.00	63,431,964	1,585,799.00
1884	4,840,987	169,434.54	56,023,893	980,418.02
1885	.....	.....	54,318,776	1,222,176.46
1886	208,800	9,667.44	48,456,260	1,405,231.54
1887	2,500,000	111,750.00	45,678,961	1,196,788.77
1888	.....	.....	44,567,157	1,203,313.23
1889	2,359,540	89,662.52	59,421,730	1,378,584.13
1890	5,082,800	203,312.00	63,181,817	1,895,454.51
1891	6,170,000	246,800.00	80,356,528	2,410,695.84
Total	40,445,619	1,796,521.33	657,982,123	16,828,652.54

	Silver.		Gold.		Copper.	
	Amount.	Value.	Amount.	Value.	Amount.	Value.
	Ounces.		*Ounces.*		*Pounds.*	
1879	3,732,247	$4,106,351.70	15,732	$298,908.00	.....	.....
1880	3,663,183	4,029,501.30	8,020	160,400.00	.....	.....
1881	4,958,345	5,503,762.95	6,982	139,640.00	.....	.....
1882	5,435,444	6,114,874.00	9,039	180,780.00	605,880	$75,735.00
1883	4,531,763	4,984,939.00	6,991	139,820.00	.....	.....
1884	5,669,488	6,123,047.04	5,530	110,600.00	63,372	6,337.20
1885	5,972,689	6,221,596.56	8,903	178,060.00	.....	.....
1886	5,918,842	5,860,837.34	10,577	211,540.00	2,407,550	144,453.00
1887	6,161,737	5,976,884.89	11,387	227,740.00	2,491,320	124,566.00
1888	6,178,855	5,787,527.51	13,886	277,720.00	2,886,816	288,681.60
1889	7,147,651	6,656,254.65	24,975	499,500.00	2,060,792	206,079.20
1890	8,165,586	8,492,209.44	33,851	677,020.00	956,708	76,536.64
1891	8,915,223	8,759,206.59	36,160	723,200.00	1,836,060	100,983.30
Total	76,451,053	78,616,993.97	192,033	3,824,928.00	13,308,498	1,023,371.94

Increase over 1890.

	Per cent.
In pounds of unrefined lead	21.18
In pounds of refined lead	21.38
In ounces of silver	9.18
In ounces of gold	6.82
In pounds of copper	90.87

Metal products for 1891.

[Furnished by J. E. Dooley, of Wells, Fargo & Co., Salt Lake City, Utah.]

	Copper.	Lead, refined.	Lead, unrefined.	Silver in bars.	Silver in base bullion and ores.	Gold in bars.	Gold in bullion and ores.
	Pounds.	*Pounds.*	*Pounds.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*
Germania Lead Works	305,000	6,170,000	3,343,000	580,000	253,100	4,135	1,096
Hanauer Smelter	350,000	.....	11,010,000	.....	851,400	.....	6,611
Mingo Smelting Co	901,630	.....	11,887,965	.....	1,062,774	.....	9,744
Daly Mining Co	.....	.....	2,682,376	850,000	397,551	710	498
Ontario Silver Mining Co	.....	.....	3,856,832	814,485	949,415	.....	918
Silver Reef District	279,430	.....	.....	49,540	2,089	.....	.....
Other mines and placers	.....	.....	.....	5,000	.....	75	.....
Net product bars and base bullion	1,836,060	6,170,000	32,780,173	2,299,025	3,516,329	4,920	18,867
Contents ores shipped	.....	.....	47,576,355	.....	3,099,869	.....	12,373
Total	1,836,060	6,170,000	80,356,528	2,299,025	6,616,198	4,920	31,240

RECAPITULATION.

Copper 1,836,060 pounds, at 5½ cents per pound	$100,983.30
Refined lead, 6,170,000 pounds, at 4 cents per pound	246,800.00
Unrefined lead, 80,356,528 pounds, at $60 per ton	2,410,695.84
Fine silver, 8,915,223 ounces, at $0.98¼ per ounce	8,759,206.59
Fine gold, 36,160 ounces, at $20 per ounce	723,200.00
Total export value	12,240,885.73

Computing the gold and silver at their mint valuation and other metals at their value at the seaboard it would increase the value of the product to $16,198,066.81.

In addition to the metals mentioned, the Territory abounds in iron, coal, sulphur, salt, slate, onyx, marble, granite, sandstone of various grades and shades of color, asphaltum, gilsonite, tripolite, fluocerite, and other minerals and mineral substances.

The capitalization of mining companies organized and incorporated under the laws of the Territory for year ending July 1, 1892, amounted at par value to $66,185.000.

BUILDINGS AND INVESTMENTS.

The following statistics from the governor's report for 1892 shows the value of buildings erected in the cities and towns, and investments in incorporated companies, during the year:

Dwellings erected or under contract	1,296
Value of dwellings erected or under contract	$1,827,384
Business houses erected or contracts for	171
Value of business houses erected or contracted for	$1,190,000

Capitalization of companies organized or incorporated under the laws of the Territory:

Manufacturing companies	$3,213,000
Land, stock, and water companies	3,578,550
Mercantile companies	2,151,500
New banks	200,000
Miscellaneous corporations not previously enumerated	52,116,500

BANKING.

Statement from governor's report for 1892.

Capital invested	$5,910,331.50
Deposits for year ending June 30, 1892	11,913,750.17

HOME INDUSTRIES.

The people of Utah have from the first settlement of the Territory encouraged home industries, and large amounts of capital and labor have been invested in enterprises calculated to develop manufactures, utilize home productions, and furnish employment to her industrious mechanics and laborers.

WOOLEN FACTORIES.

The special report on the wool industry of the United States recently issued by the Bureau of Animal Industry, United States Department of Agriculture, says the wool clip of Utah for 1892 will be found to run close to 13,500,000 pounds, and adds:

Of this amount there are worked up by Utah mills at least 1,000,000 pounds. The largest and most extensive woolen factory in the Territory is the Provo Woolen

Mills, established nearly twenty years ago at Provo. These mills have a capital stock of $300,000, and consume annually 500,000 pounds of Utah wool. They manufacture flannels, linseys, cassimeres, blankets, shawls, yarns, overshirts, underwear, knit hosiery, etc. The next mill of importance is that of the Deseret Woolen Mills Company, at Salt Lake City, which has a capacity of 350,000 to 400,000 pounds of wool per year. These are the two principal woolen mills, yet there are several other smaller ones. It would seem that there is a good opening in the Territory for other woolen factories, for they can evidently take the wool product as it comes from the grower and work it up as cheaply as any of the factories in the East, and have the expense of transportation a long distance in their favor.

SALT INDUSTRY.

The amount of salt produced by evaporation of the waters of the Great Salt Lake for the years 1891 and 1892 was 272,000 tons.

SUGAR FACTORY.

The Utah Sugar Factory for the manufacture of sugar from beets, located at Lehi, 33 miles south of Salt Lake City, is one of the largest in the United States. The expenditure for buildings and machinery amounted to $500,000. The machinery was all of American manufacture. For two years past the factory has turned out beet sugar of the finest quality. The output for the first year's run, 1891, was 1,250,000 pounds, which amount was nearly doubled for the year 1892.

While the manufacturing interests of Utah are varied and extend all over the Territory, for lack of reliable statistics only the most prominent industries are mentioned in this report.

SALT LAKE CITY MANUFACTURES.

A preliminary report on the mechanical and manufacturing industries of Salt Lake City for the year ending May 31, 1890, published by the Census Bureau, gives the following returns:

Number of industries reported	45
Number of establishments reported	149
Capital invested	$2,658,676
Hands employed	1,997
Wages paid	$1,276,219
Cost of materials used	$1,665,877
Miscellaneous expenses	$263
Value of product	$3,864,402

Statistics of manufactures of the other cities of Utah are not yet published.

ASSESSED VALUATION.

The governor's report for 1892 makes the following showing:

Assessed valuation of real and personal property in the Territory	$117,150,899.51
Assessed valuation of property in incorporated cities and towns	87,200,081.53
Indebtedness of said corporations	2,115,678.58

The real value of the property of the Territory as heretofore stated is not less than $200,000,000.

PUBLIC LANDS.

The United States land office in Salt Lake City, the only one in the Territory, reports the following business for the year ending June 30, 1892:

Number of entries	2,208
Acreage	229,666.06
Amount of receipts, including fees	$106,986.07
Total acreage of public lands surveyed up to June 30, 1891	13,188,204.16
Total acreage of public land disposed of and settled upon since opening of the land office in March, 1869, to June, 1891, was	5,906,080.30
Cash receipts	$1,368,224.27

RAILROADS.

The railroad system of Utah embraces the following:

	Miles.
Standard-gauge road	1,169.91
Narrow-gauge road	122.3

Street railroads.

	Miles.
Salt Lake City, electric	58
Ogden, electric	10
Provo, steam motor	6

The cities of Salt Lake, Ogden, Provo, Payson, Park City, and Logan are lighted by electricity.

NATURAL GAS.

Respecting the recent discoveries of natural gas in Salt Lake Valley, the governor in his report says:

For many years past it has been claimed that natural gas could be found beneath the crust of the Salt Lake Basin. Two years ago it was reported that from a well sunk near Brigham City gas had commenced to flow, which burned quite brilliantly and was used for some time. It was also reported that in Ogden City gas had been found, and in Salt Lake some well-borers discovered quite a flow.

Recent developments have confirmed the belief that gas exists, and it now appears that Salt Lake Valley is in the center of a gas belt. During the past year wells have been sunk on the shore of the Great Salt Lake in Davis County; the gas is found at a depth of some 800 feet. The gas is said to be of the best known quality, and it is claimed that some of the wells will yield an average of about 4,000,000 cubic feet in twenty-four hours with a rock pressure of 210 pounds.

It is stated the new American Gas and Fuel Company, who have sunk a number of wells, are now prepared to commence the construction of a gas plant and pipe line into Salt Lake City.

EDUCATION AND SCHOOLS.

Utah has an excellent free-school system supported by taxation, and much attention is being given to the cause of education and the schools of the Territory give promise of great development and usefulness.

Speaking of the free schools the governor in his report for 1891 says:

Under the influence of the free-school law, which first went into operation at the beginning of the last school year, September, 1890, there has been a marked increase in the attendance of pupils and a visible improvement in the methods and manner of teaching.

There now seems to be a growing desire throughout the Territory to give these schools the support which they are entitled to. In Salt Lake City the schools have been crowded beyond their capacity, and the board of education has found it difficult to supply the needed room. To remedy this a special election was held, and

the citizens voted to bond the city in the sum of $600,000 for the purpose of building and furnishing school-houses. This great interest in the cause of popular education is an encouraging feature and speaks well for the Territory and its people.

Ogden City has also issued bonds to the amount of $100,000 for the purpose of erecting additional and improved school buildings.

The amount of Territorial and district school-tax levies for the benefit of the common free schools for the year 1891 amounted to $618,685.21.

Besides the common schools, Utah has its due proportion of private, church, and denominational schools.

In his report for 1892 the commissioner of schools for Utah says:

In my last annual report the number of children of school age in the Territory was given at 66,009, of which 53,044 were of Mormon parentage and 12,965 were of non-Mormon parentage. According to the present report, the total number of children of school age in the Territory is 73,359, of which 57,532 are of Mormon parentage and 15,827 of non-Mormon parentage. This shows the increase in one year of the children of school age who are of Mormon parentage to be 0.0 8.4 per cent and the increase of those of non-Mormon parentage to be 0. 22 per cent. The schedule (Exhibit A) of school population shows that there are 10,934 children of school age in the Territory who attend no school. The report for the preceding year (1891) showed 11,059. It will therefore be noticed that, while the number of children of school age is rapidly increasing, the number of those who attend no school is decreasing.

The following table, showing that the total amount invested in the educational establishment of Utah is $1,457,965.52, and the general distribution of the schools throughout the Territory, is from the report of the commissioner of schools for 1892:

Value of school property.

Counties.	Grounds.	Buildings.	Furniture.	Apparatus.	Total.
Beaver	$535.00	$3,700.00	$1,904.25	$948.75	$8,328.00
Boxelder	2,823.00	27,134.67	5,863.57	3,993.80	39,815.04
Cache	13,495.00	66,812.96	9,825.77	2,930.68	85,483.13
Davis	8,882.97	23,922.80	5,707.50	1,873.50	40,485.95
Emery	1,733.75	5,687.17	2,633.61	1,697.55	11,752.08
Garfield	452.00	1,562.00	1,262.80	775.75	4,047.55
Grand	200.00	2,800.00	200.00	150.00	3,350.00
Iron	890.00	5,267.17	1,797.00	583.00	8,537.17
Juab	1,835.00	11,982.74	3,330.08	1,512.00	18,659.82
Kane	250.00	3,250.00	940.60	527.50	4,968.10
Millard	495.00	13,684.60	2,277.66	1,802.25	18,154.05
Morgan	2,100.00	9,300.00	1,495.00	420.00	14,722.00
Piute	275.00	1,225.00	1,635.87	859.50	3,995.37
Rich	650.00	2,900.00	875.00	675.00	5,100.00
Salt Lake (outside of city)	10,104.00	79,593.45	10,088.81	5,135.32	104,921.58
Salt Lake City	248,280.00	120,495.00	26,995.00	3,224.00	398,994.00
San Juan	.....	.....	380.60	.....	380.60
Sanpete	5,189.50	21,281.28	6,564.35	2,960.75	35,995.88
Sevier	4,480.00	4,721.00	3,781.50	1,702.25	14,684.75
Summit	6,210.00	42,441.92	5,625.68	2,123.36	56,400.96
Tooele	1,570.00	6,887.47	2,136.80	4,055.00	11,944.27
Uintah	430.00	3,765.00	1,824.45	446.00	6,481.85
Utah (outside of Provo)	14,521.00	61,107.00	11,411.70	4,694.00	91,733.70
Provo City	10,243.75	42,232.17	5,383.22	953.97	58,813.11
Wasatch	2,588.15	10,900.00	2,354.00	551.00	16,393.15
Washington	835.00	8,765.00	1,556.15	1,308.00	13,069.90
Wayne*	.....	.....	.....	.....	.....
Weber (outside of Ogden)	116,171.00	80,241.00	14,328.00	4,475.50	215,215.71
Ogden City	108,000.00	45,000.00	7,200.00	600.00	160,800.00
Total	563,039.12	704,569.40	139,378.57	50,978.43	1,457,965.52

* New county; included in Piute County.

The University of Utah at Salt Lake City and the Agricultural College at Logan, both Territorial institutions, extend the educational facilities usually afforded by similar establishments in the several States. The attendance at both is large and increasing annually.

Only about 5 per cent of the people of Utah are illiterate, and this fact, considered in connection with the educational facilities of the Territory and the ambitious character of the people, is ample assurance of one of the most essential characteristics of good citizenship. But the aim of education in Utah is not merely to reduce the number of those who are technically denominated illiterates, but to give to the pupils the same training and learning that may be had in the best schools of the East, and therefore the course of study includes not only the usual and ordinary branches, but extends to the higher studies which are taught in the schools of the older communities.

Utah has not been unmindful of the more unfortunate class of its citizens. It has established at Provo a large and well-equipped asylum for the insane, and at Ogden a reform school provided with all the necessary means for educating and instructing in some industrial pursuit such boys and girls as have no parents or homes and those who can not be controlled by home influences.

THE ENABLING ACT.

The bill provides an enabling act for the people of Utah Territory and the terms upon which the constitutional convention will be held and the constitution framed and submitted to the people for their ratification or rejection.

All male citizens over 21 years of age who have resided one year in the Territory are authorized to vote for delegates to form the convention, which shall consist of 107 delegates, who are apportioned upon the following theory of representation: Every county to have at least one delegate, and one additional for every 2,000 of population and for the larger fraction thereof. The election is to be held for delegates on the first Monday in August after the passage of this act. A new registration of voters is to be made under the provisions of the laws of the United States and the Territory, the registration to commence on the first Monday in June after the passage of this act. Delegates to the convention shall meet at the seat of government the third Monday after their election and declare, on behalf of the people of their proposed State, to adopt the Constitution of the United States; whereupon the convention is authorized to form a State constitution and government for the proposed State of Utah. It is required that such constitution shall be republican in form, and make no distinction in civil or political rank on account of race or color, except as to Indians not taxed, and not be repugnant to the Constitution of the United States and the principles of the Declaration of Independence. They shall provide by ordinance, irrevocable without the consent of the United States, that no inhabitant shall ever be molested in person or property on account of his or her mode of religious worship. The convention shall also provide that the proposed State of Utah shall forever disclaim all right and title to the unappropriated public lands lying within the boundaries thereof, and all lands lying within the limits of the State owned or held by any Indian or any Indian tribes, and until the Indian title shall have been extinguished by the United States, such Indian reservation shall be and remain subject to the disposition of the United States. All Indian lands shall remain under the absolute jurisdiction and control of the United States.

The other provisions usual in an enabling act are required, especially that the debts of the Territory are to be assumed and paid by the State, and provision made for the establishment and maintenance of public schools, to be open to all of the children of the State, free from sectarian influence. The constitution thus formed to be submitted to the people of Utah Territory for ratification or rejection, at an election to be held at a time fixed by ordinance of the convention; when, if a majority of votes cast shall be for the constitution, the governor shall certify the result to the President of the United States. If he shall find the constitution and government of said proposed State to be republican in form, and all the provisions of the enabling act are complied with, it shall be his duty to issue a proclamation announcing the result of the election; whereupon the proposed State of Utah shall be deemed admitted by Congress into the Union upon an equal footing with the original States. Also, that until the next general census, or until otherwise provided by law, Utah shall be entitled to one Representative in the Congress of the United States, who, together with the other State officers, may be elected at the same time the election is held for the adoption of the constitution. Sections 6 to 14, inclusive, relate to the different grants of lands which it is proposed Utah shall receive from the General Government. In view of the mountainous and arid character of the land, and as the larger part of all agricultural lands lying along the streams fit for cultivation without irrigation have either been homesteaded purchased, or secured under the various land acts of the Government, it is provided that sections 2, 16, 32, and 36 in every township of the proposed State are granted to it for the support of common schools, with indemnity for all lands heretofore taken up, to be made in such manner as the legislature may provide, with the approval of the Secretary of the Interior.

GRANTS OF LAND.

One hundred sections of land are granted for the purpose of erecting public buildings at the capital; 90,000 acres for the use and support of an agricultural college; 10 per cent of the proceeds of the sales of public lands within the State sold after the admission of the State, and after deducting all expenses, shall be paid to the State for a permanent fund, to be devoted to the common schools, of which the interest only shall be annually expended. All lands granted to Utah for educational purposes are to be disposed of at public sale. Two townships of land, also 110,000 acres, including all saline lands, are to be reserved and granted for the use of the University of Utah. All schools, colleges, and universities provided for in this act are to remain forever under the exclusive control of the State. No part of the proceeds of the lands can be used for the support of any sectarian or denominational school, college, or university. All mineral lands are exempt from any grant made under the act. The lands here given to the State of Utah are in lieu of all grants of lands for the purposes of internal improvements, also swamp and overflowed lands, and of saline lands, and shall be in quantities as follows:

For irrigating purposes, 500,000 acres; for insane asylum, 100,000 acres; for school of mines, 100,000 acres; for deaf and dumb asylum, 100,000 acres; for reform school, 100,000 acres; for State normal school, 100,000 acres; for an institution for the blind, 100,000 acres; for miners' hospital, 50,000 acres; also the United States penitentiary near Salt Lake City, with all lands and appurtenances attached, are granted to the State of Utah. These are specific grants of lands exclusively for

the purposes mentioned. It is expressly provided in the act that Utah is not to be entitled to any further grants of lands. All lands granted are to be sold at public sale, at not less than $5 per acre; provided, the State may lease any of the lands for a period of time not more than five years. The State of Utah to comprise one judicial district, for which there shall be one United States district judge, one attorney, one marshal, and a clerk for each of the circuit and district courts, with proper provisions for the transfer of all business from the courts of the Territory to the Federal courts of the State; and also provides for all cases of appeal or writs of error in cases pending now or hereafter in the Territorial courts to the Supreme Court of the United States. Section 19 appropriates $30,000 to the Territory for defraying the expenses of the convention. Section 20 provides that the convention shall, by ordinance, provide for the election of officers for the new State government, including members of the legislature and a Representative in the Fifty-third Congress, all of whom shall remain in abeyance until the State is admitted into the Union. If admitted, the legislature shall assemble and elect two Senators, in the manner prescribed by the laws of the United States; and upon the governor's certificates the Senators and Representative shall be entitled to seats in Congress. Also, that all laws in force in the Territory at the time of its admission into the Union shall be in force in the State until modified or changed, according to its constitution and laws.

SUMMARY AND RECOMMENDATION.

The Mormon Church and its adherents have been subjected for long years to the sharpest and most unkindly criticisms; and heretofore all prayers of the Mormon people for statehood have been denied. Inasmuch as your committee have come to the conclusion that the time for statehood for Utah has at last arrived, it is eminently proper that the characteristics of the Mormon people shall be made known, not only for the information of Congress, but of the nation.

These statements will be repeated from the pulpit and the stump, and around Christian firesides.

Many myriads of people who heretofore have looked upon the Mormons as moral outlaws, it is believed, will change their opinion, and admit that a people showing the characteristics that the Mormons possess, are at last worthy of statehood with full admission to all the rights of American citizenship. Upon this branch of the question, your committee quote from the argument of Judge Jeremiah M. Wilson, of Washington City, made before the Committee on Territories in 1889. Judge Wilson, among other things, said:

Utah is applying for admission and we have therefore to inquire, first, whether the conditions Congress has a right to require exist; and second, if they do, whether there is anything outside of these conditions that will justify a refusal.

Utah has more than 200,000 inhabitants; much above the number required. That is not disputed.

Utah has a public-school system of the highest order of excellence and a university of high repute. Every denomination of the Christian churches have their seminaries of learning, and the result of it is as near universality of education—indeed less illiteracy than is to be found in any other Territory and a majority of the States. This is not disputed.

As a temperate, orderly, law-abiding, industrious, thrifty people, the population of Utah have at least no superiors. This is not disputed.

The ownership of the land, that great source of good conservative citizenship, is more evenly and universally distributed among these people than those of any other Territory in the nation. This is not disputed.

Her manufactures include almost every useful article. The products of her soil and the yield of her mines aggregate a great many millions of dollars annually, and she has flocks and herds whose value alone is not less than $30,000,000. None of this is disputed.

Her charitable institutions are abreast of our advanced civilization. This is not disputed.

No people are freer from the vices that seem to be attendant upon humanity and infest compacted populations. This will not be disputed.

Utah is situated midway between the great rivers of the West and the Pacific, and is traversed by lines of transcontinental railways—highways of the continent, and it is no exaggeration to say highways of the world. Her geographical position, together with her vast agricultural, mineral, and manufacturing resources, and the intelligence, energy, and high character of her people make statehood of vast importance, not only to Utah, but to the whole country. This will not be disputed.

In view of the foregoing, political reasons alone can no longer be urged to delay the admission of Utah as a State.

All mouths should be hushed, and all opposition silenced, after the President has amnestied all past offenses; after both political parties in national convention assembled have declared that the time has come for the admission of all the Territories, of which Utah is one; after the Territorial conventions of 1892, wherein both of said great parties declared for statehood, and that the hour is ripe for the admission of Utah; after the legislature of Utah has declared unanimously for statehood; after the governor of the Territory, all of its Territorial officers, and its judiciary, all of whom are Republicans in politics, have declared, that in their opinion polygamy is abolished and at an end; after all the members of the Utah Commission, a commission created expressly to crush and obliterate polygamy have declared their work practically accomplished; after the Mormon Church, through all of its heads and officials, publicly, privately, and in every way possible for mortals to do and proclaim, have with bowed heads, if not in anguish, pledged their faith and honor that nevermore in the future shall polygamy within the Mormon Church be either a doctrine of faith or of practice, there certainly can be but one sentiment, but one opinion among all just-minded legislators in Congress upon the question of duty, and that is to admit Utah as a State into the Federal Union.

Your committee recommend that the bill do pass.

Mr. WHEELER, from the Committee on the Territories, submitted the following

VIEWS OF THE MINORITY

[Upon H. R. 352, to enable the people of Utah to form a constitution and State government, and to be admitted into the Union on an equal footing with the original States.]

The undersigned are deeply impressed with the importance of very speedily enacting a law for the admission of the Territory of Utah as a State. This Territory possesses every requirement essential to statehood. Its population is many times the average population of Territories heretofore admitted as States, and its resources are already far greater than some of the States of the Union.

The census of 1890 places the population of Utah at 207,905, which is 15,041 more than the combined population of the States of Montana and Wyoming and 17,054 in excess of the entire population of the adjoining States, Nevada, Idaho, and Wyoming, and 34,004 more than required under the census of 1890 for a Representative in Congress.

The population has greatly increased since the census was taken. The governor of the Territory in his report to the Secretary of the Interior, dated October 1, 1892, estimates the population at 223,930, being an increase of 16,025 over the census report. This is deemed a very conservative estimate, and the population to-day may be safely placed at 240,000, and many estimate its present population as high as 250,000.

Of the 207,905 inhabitants given by the census report there were:

Males	110,463
Females	97,442
Excess of males	13,021

The population of the Territory has a steady growth by immigration from other States and foreign countries, but more especially by births. The census reports give the following facts:

Between the ages of 5 and 17 years	67,465
Native born	62,463
Foreign born	5,002
Between the ages of 18 and 20 years	12,472
Native born	10,519
Foreign born	1,953

Males between ages of 5 and 20 years	40,498
Females between ages of 5 and 20 years	39,439
Total	79,937
Total males of voting age	54,471

The idea often expressed by persons ignorant of the facts, that the people of Utah are mostly foreigners, is most successfully refuted by the census reports, which make the following showing:

Total American born	154,841
Total foreign born	53,064

The proportion of foreign born to American born in Utah is less than in the States of North Dakota, Minnesota, Montana, Nevada, Wisconsin, Rhode Island, California, Massachusetts, South Dakota, New York, Michigan, Washington, and the Territory of Arizona.

Only in three States and one Territory has the foreign population decreased more than in Utah during the census decade.

The percentage of aliens who speak the English language is greater in Utah than in thirty-two States and two Territories.

The population of Utah consists largely of the white element, there being of colored persons, embracing civilized Indians, Chinese, Japanese, and Hawaiians, as well as negroes, only 2,006 in the entire Territory; less in proportion to the whites than any of the Pacific States and Territories.

The total number of votes cast at the election for Delegate held in November, 1892, was 34,577, being an increase of 10,812 over the election for members of the legislature held the year previous.

RESOURCES OF UTAH.

Utah has all the elements of greatness within its borders. Its resources being varied, diversified industries flourish and the future gives promise of wonderful results. The splendid system of irrigation which has been provided, largely by community coöperation, renders crops certain, and assures food supplies at cheap rates.

AGRICULTURAL RESOURCES.

The agricultural interests of the Territory have always been considered of paramount importance, the greater number of the old settlers being farmers and stock-raisers. The governor in his report for 1891 places the value of agricultural products, including wheat, rye, oats, barley, corn, potatoes, beets, hay, alfalfa, orchard fruits, vinegar, vegetables, cotton, wool, butter, cheese, dried fruits, honey, sorghum, wine, and cider, as reported by the county assessors, at $10,218,527.28.

From the census returns of 1890 we learn that in Utah the total area in cereals in 1889 was 122,878 acres. The production of cereals for the year 1889, embracing barley, buckwheat, Indian corn, oats, rye, and wheat, amounted to 2,395,744 bushels.

PROGRESS IN IRRIGATION.

The census reports of 1890 furnish the following relative to irrigation in Utah:

In Utah crops were raised by irrigation in the census year ended June 30, 1890, on 263,473 acres, or 411.68 square miles, a trifle over five-tenths of 1 per cent of the entire area of the Territory. The aggregate number of farms was 10,757, and of these 9,724, or about nine-tenths, depended upon irrigation, the remaining tenth being either stock ranches or farms in the northern end of the Territory, where the climate is less arid, or situated so high in the mountains that crops can be raised by what is known as "dry farming."

The average size of irrigated farms, or rather of irrigated portions of farms, was 27 acres. In this connection the term "irrigated farm" is used to include only the area on which crops were raised by irrigation, the uncultivated portions of such farms not being taken into account. With this understanding, irrigated farms have been classified as follows: 5 irrigated farms of 640 acres or upward; 13 of from 320 to 640 acres; 65 of from 160 to 320 acres. These 83 farms contained an average of 312 acres each, and had a total area of 25,857 acres, or nearly 10 per cent of the entire amount watered in the Territory. The remaining 9,641 farms, under 160 acres in size, comprised over 90 per cent of the total irrigated area, and averaged 25 acres each.

Average value of products per acre, $18.03.

The Territory has about 3,000 miles of irrigating canals.

HORSES, MULES, CATTLE, AND SHEEP.

The governor's report for 1892 gives the following statistics relative to the stock industry of the Territory:

Number of horses and mules	87,457
Assessed valuation of horses and mules	$3,084,473
Number of cattle	255,675
Assessed valuation of cattle	$3,000,372

The number of sheep in Utah, according to statistics furnished by the United States Agricultural Department for 1892, was 2,800,000, which, at an average valuation of $2, amounts to $5,600,000.

The wool clip for 1892 is estimated at 13,500,000 pounds; valued at 16 cents per pound would amount $2,160,100.

GOLD, SILVER, LEAD, AND COPPER.

The following tables are from the governor's report for 1892:

Statement showing value and amount of the principal mineral products of Utah from 1879 to 1891, both inclusive.

	Refined lead.		Unrefined lead.	
	Amouut.	Value.	Amount.	Value.
	Pounds.		*Pounds.*	
1879	2,301,276	$103,557.42	26,315,359	$592,095.57
1880	2,892,498	144,624.90	25,657,643	641,444.75
1881	2,645,373	145,495.51	38,222,185	955,554.62
1882	8,213,798	410,690.00	52,349,850	1,361,096.00
1883	3,230,547	161,527.00	63,431,964	1,585,799.00
1884	4,840,987	169,434.54	56,023,893	980,418.02
1885	.....	.....	54,318,776	1,222,176.46
1886	208,800	9,667.44	48,456,260	1,405,231.54
1887	2,500,000	111,750.00	45,678,961	1,196,788.77
1888	.....	.....	44,567,157	1,203,313.23
1889	2,359,540	89,662.52	59,421,730	1,378,584.13
1890	5,082,800	203,312.00	63,181,817	1,895,454.51
1891	6,170,000	246,800.00	80,356,528	2,410,695.84
Total	40,445,619	1,796,521.33	657,982,123	16,828,652.54

Statement showing value and amount of the principal mineral products of Utah from 1879 to 1891, both inclusive—Continued.

	Silver.		Gold.		Copper.	
	Amount.	Value.	Amouut.	Value.	Amount.	Value.
	Ounces.		*Ounces.*		*Pounds.*	
1879	3,732,247	$4,106,351.70	15,732	$298,908.00	.....	.....
1880	3,663,183	4,029,501.30	8,020	160,400.00	.....	.....
1881	4,958,345	5,503,762.95	6,982	139.640.00	.....	.....
1882	5,435,444	6,114,874.00	9,039	180,780.00	605,880	$75,735.00
1883	4,531,763	4,984,939.00	6,991	139,820.00	.....	.....
1884	5,669,488	6,123,047.04	5,530	110,600.00	63,372	6,337.20
1885	5,972,689	6,221,596.56	8,903	178,060.00	.....	.....
1886	5.918,842	5,860,837.34	10,577	211,540.00	2,407,550	144,453.00
1887	6,161,737	5,976,884.89	11,387	227,740.00	2,491,320	124,566.00
1888	6,178,855	5,787,527.51	13,886	277,720.00	2,886.816	288,681.60
1889	7,147,651	6,656,254.65	24,975	499,500.00	2,060,792	206,079.20
1890	8,165,586	8,492,209.44	33,851	677,020.00	956,708	76.536.64
1891	8,915,223	8,759,206.59	36,160	723,200.00	1,836.060	100,983.30
Total	76,451,053	78,616,993.97	192,033	3,824,928.00	13,308,498	1,023,371.94

Increase over 1890.

	Per cent.
In pounds of unrefined lead	21.18
In pounds of refined lead	21.38
In ounces of silver	9.18
In ounces of gold	6.82
In pounds of copper	90.87

Metal products for 1891.

[Furnished by J. E. Dooley, of Wells, Fargo & Co., Salt Lake City, Utah.]

	Copper.	Lead, refined.	Lead, unrefined.	Silver in bars.	Silver in base bullion and ores.	Gold in bars.	Gold in bullion and ores.
	Pounds.	*Pounds.*	*Pounds.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*
Germania Lead Works	305,000	6,170,000	3,343,000	580,000	253,100	4,135	1,096
Hanauer Smelter	350,000	.....	11,010,000	.....	851,400	.....	6,611
Mingo Smelting Co	901,630	.....	11,887,965	.....	1,062,774	.....	9,744
Daly Mining Co	.....	.....	2,682,376	850,000	397,551	710	498
Ontario Silver Mining Co	.....	.....	3,856,832	814,485	949,415	.....	918
Silver Reef District	279,430	.....	.....	49,540	2,089	.....	.....
Other mines and placers	.....	.....	.....	5,000	.....	75	.....
Net product bars and base bullion	1,836,060	6,170,000	32,780,173	2,299,025	3,516,329	4,920	18,867
Contents ores shipped	.....	.....	47,576,355	.....	3,099,869	.....	12,373
Total	1,836,060	6,170,000	80,356,528	2,299,025	6,616,198	4,920	31,240

RECAPITULATION.

Copper, 1,836,060 pounds, at 5½ cents per pound	$100,983.30
Refined lead, 6,170,000 pounds, at 4 cents per pound	246,800.00
Unrefined lead, 80,356,528 pounds, at $60 per ton	2,410,695.84
Fine silver, 8,915,223 ounces, at $0.98¼ per ounce	8,759,206.59
Fine gold, 36,160 ounces, at $20 per ounce	723,200.00
Total export value	12,240,885.73

Computing the gold and silver at their mint valuation and other metals at their value at the seaboard it would increase the value of the product to $16,198,066.81.

In addition to the metals mentioned, the Territory abounds in iron, coal, sulphur, salt, slate, onyx, marble, granite, sandstone of various grades and shades of color, asphaltum, gilsonite, tripolite, fluocerite, and other minerals and mineral substances.

The capitalization of mining companies organized and incorporated under the laws of the Territory for year ending July 1, 1892, amounted at par value to $66,185,000.

MATERIAL DEVELOPMENT.

The following statistics from the governor's report for 1892 shows the value of buildings erected in the cities and towns, and investments in incorporated companies, during the year:

Dwellings erected or under contract	1,296
Value of dwellings erected or under contract	$1,827,384
Business houses erected or contracts for	171
Value of business houses erected or contracted for	$1,190,000

Capitalization of companies organized or incorporated under the laws of the Territory.

Manufacturing companies	$3,213,000
Land, stock, and water companies	3,578,550
Mercantile companies	2,151,500
New banks	200,000
Miscellaneous corporations not previously enumerated	52,116,500

BANKS AND FINANCIAL INSTITUTIONS.

Statement from governor's report for 1892.

Capital invested	$5,910,331.50
Deposits for year ending June 30, 1892	11,913,750.17

OTHER INDUSTRIES.

The people of Utah have from the first settlement of the Territory encouraged home industries, and large amounts of capital and labor have been invested in enterprises calculated to develop manufactures, utilize home productions, and furnish employment to her industrious mechanics and laborers.

WOOL INDUSTRY.

The special report on the wool industry of the United States recently issued by the Bureau of Animal Industry, United States Department of Agriculture, says the wool clip of Utah for 1892 will be found to run close to 13,500,000 pounds, and adds:

Of this amount there are worked up by Utah mills at least 1,000,000 pounds. The largest and most extensive woolen factory in the Territory is the Provo Woolen Mills, established nearly twenty years ago, at Provo. These mills have a capital stock of $300,000, and consume annually 500,000 pounds of Utah wool. They manufacture flannels, linseys, cassimeres, blankets, shawls, yarns, overshirts, underwear, knit hosiery, etc. The next mill of importance is that of the Deseret Woolen Mills Company, at Salt Lake City, which has a capacity of 350,000 to 400,000 pounds of wool per year. These are the two principal woolen mills, yet there are several other smaller ones. It would seem that there is a good opening in the Territory for other woolen factories, for they can evidently take the wool product as it comes from the grower and work it up as cheaply as any of the factories in the East, and have the expense of transportation a long distance in their favor.

SALT WORKS.

The amount of salt produced by evaporation of the waters of the Great Salt Lake for the years 1891 and 1892 was 272,000 tons.

SUGAR REFINERY.

The Utah Sugar refinery for the manufacture of sugar from beets, located at Lehi, 33 miles south of Salt Lake City, is one of the largest in the United States. The expenditure for buildings and machinery

amounted to $500,000. The machinery was all of American manufacture. For two years past the factory has turned out beet sugar of the finest quality. The output for the first year's run, 1891, was 1,250,000 pounds, which amount was nearly doubled for the year 1892.

While the manufacturing interests of Utah are varied and extend all over the Territory, for lack of reliable statistics only the most prominent industries are mentioned in this report.

MANUFACTORIES IN SALT LAKE CITY.

A preliminary report on the mechanical and manufacturing industries of Salt Lake City for the year ending May 31, 1890, published by the Census Bureau, gives the following returns:

Number of industries reported	45
Number of establishments reported	149
Capital invested	$2,658,676
Hands employed	1,997
Wages paid	$1,276,219
Cost of materials used	$1,665,877
Miscellaneous expenses	$263
Value of product	$3,864,402

Statistics of manufactures of the other cities of Utah are not yet published.

VALUATION OF PROPERTY IN UTAH.

The governor's report for 1892 makes the following showing:

Assessed valuation of real and personal property in the Territory	$117,150,899.51
Assessed valuation of property in incorporated cities and towns	$87,200,081.53
Indebtedness of said corporations	$2,115,678.58

The real value of the property of the Territory as heretofore stated is not less than $200,000,000.

PUBLIC LANDS IN UTAH.

The United States land office in Salt Lake City, the only one in the Territory, reports the following business for the year ending June 30, 1892:

Number of entries	2,208
Acreage	229,666.06
Amount of receipts, including fees	$106,986.07
Total acreage of public lands surveyed up to June 30, 1891	13,188,204.16
Total acreage of public land disposed of and settled upon since opening of the land office in March, 1869, to June, 1891, was	5,906,080.30
Cash receipts	$1,368,224.27

UTAH'S RAILROADS.

The railroad system of Utah embraces the following:

	Miles.
Standard-gauge road	1,169.91
Narrow-gauge road	122.3

Street railroads.

	Miles.
Salt Lake City, electric	58
Ogden, electric	10
Provo, steam motor	6

The cities of Salt Lake, Ogden, Provo, Payson, Park City, and Logan are lighted by electricity.

NATURAL GAS IN UTAH.

Respecting the recent discoveries of natural gas in Salt Lake Valley, the governor in his report says:

For many years past it has been claimed that natural gas could be found beneath the crust of the Salt Lake Basin. Two years ago it was reported that from a well sunk near Brigham City gas had commenced to flow, which burned quite brilliantly and was used for some time. It was also reported that in Ogden City gas had been found, and in Salt Lake some well-borers discovered quite a flow.

Recent developments have confirmed the belief that gas exists, and it now appears that Salt Lake Valley is in the center of a gas belt. During the past year wells have been sunk on the shore of the Great Salt Lake in Davis County; the gas is found at a depth of some 800 feet. The gas is said to be of the best known quality, and it is claimed that some of the wells will yield an average of about 4,000,000 cubic feet in twenty-four hours with a rock pressure of 210 pounds.

It is stated the new American Gas and Fuel Company, who have sunk a number of wells, are now prepared to commence the construction of a gas plant and pipe line into Salt Lake City.

PROGRESS IN SCHOOL SYSTEM.

Utah has an excellent free-school system supported by taxation, and much attention is being given to the cause of education, and the schools of the Territory give promise of great development and usefulness.

Speaking of the free schools the governor in his report for 1891 says:

Under the influence of the free-school law, which first went into operation at the beginning of the last school year, September, 1890, there has been a marked increase in the attendance of pupils and a visible improvement in the methods and manner of teaching.

There now seems to be a growing desire throughout the Territory to give these schools the support which they are entitled to. In Salt Lake City the schools have been crowded beyond their capacity, and the board of education has found it difficult to supply the needed room. To remedy this a special election was held, and the citizens voted to bond the city in the sum of $600,000 for the purpose of building and furnishing schoolhouses. This great interest in the cause of popular education is an encouraging feature and speaks well for the Territory and its people.

Ogden City has also issued bonds to the amount of $100,000 for the purpose of erecting additional and improved school buildings.

The amount of Territorial and district school-tax levied for the benefit of the common free schools for the year 1891 amounted to $618,685.21.

Besides the common schools, Utah has its due proportion of private, church, and denominational schools.

In his report for 1892 the commissioner of schools for Utah says:

In my last annual report the number of children of school age in the Territory was given at 66,009, of which 53,044 were of Mormon parentage and 12,965 were of non-Mormon parentage. According to the present report, the total number of children of school age in the Territory is 73,359, of which 57,532 are of Mormon parentage and 15,827 of non-Mormon parentage. This shows the increase in one year of the children of school age who are of Mormon parentage to be 0.084 per cent and the increase of those of non-Mormon parentage to be 0.22 per cent. The schedule (Exhibit A) of school population shows that there are 10,934 children of school age in the Territory who attend no school. The report for the preceding year (1891) showed 11,059. It will therefore be noticed that, while the number of children of school age is rapidly increasing, the number of those who attend no school is decreasing.

The following table, showing that the total amount invested in the educational establishment of Utah is $1,457,965.52, and the general distribution of the schools throughout the Territory, is from the report of the commissioner of schools for 1892:

Value of school property.

Counties.	Grounds.	Buildings.	Furniture.	Apparatus.	Total.
Beaver	$535.00	$3,700.00	$1,904.25	$948.75	$8,328.00
Boxelder	2,823.00	27,134.67	5,863.57	3,993.80	39,815.04
Cache	13,495.00	66,812.96	9,825.77	2,930.68	85,483.13
Davis	8,882.97	23,922.80	5,707.50	1,873.50	40,485.95
Emery	1,733.75	5,687.17	2,633.61	1,697.55	11,752.08
Garfield	452.00	1,562.00	1,262.80	775.75	4,047.55
Grand	200.00	2,800.00	200.00	150.00	3,350.00
Iron	890.00	5,267.17	1,797.00	583.00	8,537.17
Juab	1,835.00	11,982.74	3,330.08	1,512.00	18,659.82
Kane	250.00	3,250.00	940.60	527.50	4,968.10
Millard	495.00	13,684.60	2,277.66	1,802.25	18,154.05
Morgan	2,100.00	9,300.00	1,495.00	420.00	14,722.00
Piute	275.00	1,225.00	1,635.87	859.50	3,995.37
Rich	650.00	2,900.00	875.00	675.00	5,100.00
Salt Lake (outside of city)	10,104.00	79,593.45	10,088.81	5,135.32	104,921.58
Salt Lake City	248,280.00	120,495.00	26,995.00	3,324.00	398,994.00
San Juan	----------	----------	380.60	----------	380.60
Sanpete	5,189.50	21,281.28	6,564.35	2,960.75	35,995.88
Sevier	4,480.00	4,721.00	3,781.50	1,702.25	14,684.75
Summit	6,210.00	42,441.92	5 625.68	2,123.36	56,400.96
Tooele	1,570.00	6,887.47	2,136.80	4,055.00	11,944.27
Uintah	430.00	3,765.00	1,824.45	446.00	6,481.85
Utah (outside of Provo)	14,521.00	61,107.00	11,411.70	4,694.00	91,733.70
Provo City	10,243.75	42,232.17	5,383.22	953.97	58,813.11
Wasatch	2,588.15	10,900.00	2,354.00	551.00	16,393.15
Washington	835.00	8,765.00	1,556.15	1,308.00	13,069.90
Wayne*	----------	----------	----------	----------	----------
Weber (outside of Ogden)	116,171.00	80,241.00	14,328.00	4,475.50	215,215.71
Ogden City	108,000.00	45,000.00	7,200.00	600.00	160,800.00
Total	563,039.12	704,569.40	139,378.57	50,978.43	1,457,965.52

*New county; included in Piute County.

The University of Utah at Salt Lake City and the Agricultural College at Logan, both Territorial institutions, extend the educational facilities usually afforded by similar establishments in the several States. The attendance at both is large and increasing annually.

Only about 5 per cent of the people of Utah are illiterate, and this fact, considered in connection with the educational facilities of the Territory and the ambitious character of the people, is ample assurance of one of the most essential characteristics of good citizenship. But the aim of education in Utah is not merely to reduce the number of those who are technically denominated illiterates, but to give to the pupils the same training and learning that may be had in the best schools of the East, and therefore the course of study includes not only the usual and ordinary branches, but extends to the higher studies which are taught in the schools of the older communities.

Utah has not been unmindful of the more unfortunate class of its citizens. It has established at Provo a large and well-equipped asylum for the insane, and at Ogden a reform school provided with all the necessary means for educating and instructing in some industrial pursuit such boys and girls as have no parents or homes and those who can not be controlled by home influences.

The minority of the committee insist that a Territory giving such manifest evidence of progress and wealth should be admitted to the sisterhood of States with all promptitude possible.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 416.

IN THE SENATE OF THE UNITED STATES.

MAY 18, 1894.—Ordered to be printed.

Mr. BLANCHARD, from the Committee on Indian Affairs, submitted the following

REPORT:

[To accompany S. 1803.]

The Committee on Indian Affairs, to whom was referred the bill (S. 1803) "Authorizing the construction of a wagon road on the Hoopa Valley Indian Reservation, in the State of California, and making appropriation therefor," having duly considered the same, report it back with the recommendation that it do pass.

In support of this recommendation your committee append hereto, as part of this report, the accompanying executive communications, viz:

(1) Letter of the honorable Secretary of the Interior to the President of the U. S. Senate, dated February 13, 1894.

(2) Letter of the honorable Commissioner of Indian Affairs to the Secretary of the Interior, dated February 10, 1894.

(3) Letter of William E. Dougherty, captain, U. S. Army, acting Indian agent, to the Commissioner of Indian Affairs, dated at Hoopa Valley Agency, Cal., November 21, 1893.

DEPARTMENT OF THE INTERIOR,
Washington, February 13, 1894.

SIR: I have the honor to transmit herewith copy of a communication of 10th instant from the Commissioner of Indian Affairs, and accompanying draft of a bill authorizing the construction of a wagon road on the Hoopa Valley Indian Reservation, in the State of California, and making appropriation therefor.

The letters of the Commissioner and the acting agent, Capt. Wm. E. Dougherty, U. S. A., show the necessity for the construction of this road, and the matter is respectfully submitted for the early and favorable consideration of Congress.

I have the honor to be, very respectfully,

HOKE SMITH,
Secretary.

The PRESIDENT OF THE U. S. SENATE.

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, February 10, 1894.

SIR: I am in receipt of a communication from Capt. W. E. Dougherty, U. S. Army, acting Indian agent in charge of the Hoopa Valley Agency, Cal., dated November 21, 1893, in which he states that the superficial area of Hoopa Valley proper is about 4,500 acres; that of this area the high-water flood plain of the Trinity River takes in

fully one-third, leaving at low water extensive benches and bars shorn of vegetation and soil; that of the remaining 1,500 acres about 900 are cultivated, and possibly 500 can not be reclaimed for some years, if at all; that a further extension of cultivation is therefore impossible in the valley; that some years ago, when serving there, he prevailed upon the people to abandon the villages, and by furnishing them with lumber and aiding them in the construction of frame houses, and by dividing the land among them in small lots, induced them to live apart and independently and depend chiefly on agriculture for subsistence instead of upon acorns and salmon; that the response to the requirement was much more prompt and general than he anticipated; that he found it was impossible to supply the people according to their ability and means with the amount of arable land necessary to subsist themselves and their stock, which in a couple of years increased materially; that he now finds himself confronted with the same necessity that existed when he left the reservation; that the population of the valley must be thinned out and part of it placed on the new land, thereby giving more room and enlarging the holdings of those who remain; that many of the most industrious and capable are now anxious to move; that several of them have already taken up locations on the new land, and two families are living there permanently in greatly advanced comfort and abundance; that he is familiar with the locality referred to, having been over it many times, and estimates, roughly, that 2,000 acres of it can be brought under cultivation without any labor in clearing it; that water is abundant, the springs being numerous, and the oak and fir timber is the finest on the reservation, the soil being fertile and adapted to the growth of grain; that to make this tract available for occupancy and cultivation it must be made accessible over a wagon road, about 10 miles of which should be opened, and that the greater part of the labor would be on the first 3 miles. He estimates the cost of the labor and materials necessary to construct this work at $3,509, and recommends that a bill be prepared to appropriate that amount for the purpose. He submits a rough map of the reservation, showing the locality referred to and the route of the proposed road.

I do not deem it necessary, however, to submit copies of this map.

Agent Dougherty is thoroughly familiar with the Hoopa Valley Reservation and of the needs and requirements of the Indians thereon. From his statements there is no doubt but that the construction of the proposed road would be of great advantage to the Indians and enable them to utilize this body of agricultural land which it is necessary that they should have.

I have, therefore, prepared a draft of a bill authorizing the construction of this road and appropriating the sum of $3,509 therefor, and have the honor to recommend that it be transmitted to Congress with request for favorable consideration.

Very respectfully, your obedient servant,

D. M. BROWNING,
Commissioner.

The SECRETARY OF THE INTERIOR.

U. S. INDIAN SERVICE,
Hoopa Valley Agency, Cal., November 21, 1893.

SIR: I have the honor to inclose a roughly made plat of this reservation, which shows, approximately, the location and extent of the arable land on the northern part of it, which is not available to the Indians on account of the difficulty of reaching it with the means to bring it under cultivation, and of getting to it from the valley, the only routes being difficult trails for pack or riding animals.

The superficial area of Hoopa Valley proper is about 4,500 acres. Of this area, the high-water flood plain of the Trinity River takes in fully one-third, leaving at low water extensive benches and bars shorn of vegetation and soil. Of the remaining 1,500 acres, about 900 are cultivated, and possibly 500 can not be reclaimed for some years, if at all; 60 to 70 acres are covered with orchards, and the residue of 30 to 40 acres will be brought under cultivation this year. A further extension of cultivation is therefore impossible in the valley.

Some years ago, when serving here, I prevailed upon the people to abandon the villages (rancheries), and by furnishing them with lumber and aiding them in the construction of frame houses and by dividing the land among them in small lots, induced them to live apart and independently and depend chiefly on agriculture for subsistence, instead of upon acorns and salmon. The response to this requirement was much more prompt and general than I anticipated, and I found that it was impossible to supply the people according to their ability and means with the amount of arable land necessary to subsist themselves and their stock, which in a couple of years increased materially. Soon afterwards I was relieved. Meantime no change has occurred, and I find myself confronted with the same necessity that

existed when I left here. The population of the valley must be thinned out, and part of it placed on the new land, thereby giving more room here and enlarging the holdings of those who remain. Many of the most industrious and capable are now anxious to move (which they were not before). Several have already taken up locations on the new land, and two families are living there permanently in greatly enhanced comfort and abundance.

I am familiar with the locality referred to, having been over it many times, and I estimate roughly that 2,000 acres of it can be brought under cultivation without any labor in clearing it. Water is abundant, springs being very numerous, and the oak and fir timber is the finest in the reservation. The soil is fertile and adapted to the growth of grain.

To make this tract available for occupancy and cultivation it must be made accessible over a wagon road. About 10 miles of road should be opened. The greater part of the labor would be on the first 3 miles. I went over this section yesterday with a hand level, and estimate that about 3,400 cubic yards of earth would have to be moved, and over the whole distance about 7,000. The remainder of the survey is over ground so easily worked that a valuation is difficult and scarcely necessary, being open ground on easy grade. Very little blasting would be necessary, and no bridging on any part of the route.

The work should be done by day labor by Indians. The following is my estimate of the cost:

1 span work mules		$300.00
1 pair double harness		25.00
1 side-hill plow		18.00
1 dozen shovels, L. H. B. & H		12.00
½ dozen spades, L. H. B. & H		6.00
1 dozen picks and handles		18.00
½ dozen axes, handled		9.00
1 cross-cut saw, handled		8.00
2 crowbars, solid steel, 20-inch		6.00
Drills and tool, steel		5.00
Explosives		12.00
Labor		419.00
2 overseers (Indians), 60 days, at $1.50 per day	$180.00	
Labor, 30 Indians, 60 days, at $1	1,800.00	
Subsistence of 32 Indians, 60 days, at 50 cents per day	960.00	
Contingencies	150.00	
		3,090.00
Total		3,509.00

I recommend that a bill be prepared embracing the above-described subject, to appropriate the amount shown above for the purpose, and that it be submitted to the House of Representatives as early as possible in the next regular session.

I am, sir, very respectfully, your obedient servant,

WM. E. DOUGHERTY,
Captain, U. S. Army, Acting Indian Agent.

The COMMISSIONER OF INDIAN AFFAIRS,
Washington, D. C.

A BILL authorizing the construction of a wagon road on the Hoopa Valley Indian Reservation, in the State of California, and making appropriation therefor.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the sum of three thousand five hundred and nine dollars, or so much thereof as may be necessary, be, and the same hereby is, appropriated, out of any money in the Treasury not otherwise appropriated, for the construction of a wagon road on the Hoopa Valley Indian Reservation, in the State of California, in accordance with the recommendation of Captain W. E. Dougherty, United States Army, acting Indian agent in charge of said reservation, to the Commissioner of Indian Affairs, dated November twenty-first, eighteen hundred and ninety-three, and his estimates therein.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 417.

IN THE SENATE OF THE UNITED STATES.

MAY 18, 1894.—Ordered to be printed.

Mr. WHITE, from the Committee on Commerce, submitted the following

REPORT:

[To accompany S. 1990.]

The Committee on Commerce, to whom was referred the bill (S. 1990) to amend an act approved August 19, 1890, entitled "An act to adopt regulations for preventing collisions at sea," report the same with a favorable recommendation, and submit the following communications as explanatory of the bill and beg that the same be considered, together with report No. 364 accompanying S. 1965. The present bill is designed to take the place of S. 1965.

TREASURY DEPARTMENT, BUREAU OF NAVIGATION,
Washington, D. C., May 4, 1894.

MY DEAR SENATOR: Referring to our conversation in the "Marble Room" yesterday, I have put in writing, as you suggested, some of the reasons for the passage of the bill, and a statement in detail of its provisions. Emphasis may be put on the fact, should any discussion arise, that any departure from the exact language used in the act of August 19, 1890, and the proposed amendments, must be submitted to other governments and would thus postpone indefinitely an agreement which has already hung fire for over three years, though every maritime nation wishes its enforcement.

The passage of this biil would lead to the enforcement next year by the principal maritime nations of the international regulations to prevent collisions at sea, proposed by the International Marine Conference of 1889, held at Washington.

Those regulations were unanimously adopted by the conference, at which twenty-seven nations were represented and were referred by the delegates to their respective governments for consideration. Congress, by the act of August 19, 1890, enacted the regulations in their entirety with the proviso that they should not go into effect until the President should issue a proclamation fixing the date of their enforcement.

This course was taken by Congress in accord with the unanimous recommendation of the delegates representing the United States. An international agreement being necessary to give full effect to the regulations, the date for the enforcement of the act of August 19, 1890, was left to the discretion of the President, his power to be exercised when the maritime nations indicated their willingness to accept and enforce the proposed regulations.

This willingness has been made to appear this month through the customary diplomatic channels, but it is the desire of the maritime nations, parties to the conference, that the regulations proposed by the conference and enacted by Congress in 1890 be modified in a few particulars before they are put into operation. These modifications are all included in the bill submitted. The most important amendment repeals article 9 relative to fishing vessels. This article has proved to be generally objectionable. Differences in the modes of fishing employed by the various

maritime nations render it difficult, if not impossible, to frame common regulations for all. It is understood that the repeal of this article will leave in force the provisions of article 10 of the act of March 3, 1885, which now regulate fishing vessels.

The second important amendment is the note to article 21, embodying a proposition which the delegates of the United States endeavored to have incorporated in the recommendations of the conference. In this they were outvoted by the delegates of foreign powers, but those foreign powers now wish that proposition incorporated in the regulations.

The remaining amendments are of minor consequence, but their enactment is desirable to secure complete uniformity, necessary to a body of international regulations. A statement of those amendments in detail follows:

ARTICLE 7.

The amendment to article 7 consists in the insertion of the words "and rowing boats" in the third line, and the addition of subdivision 4, reading "Rowing boats, whether under oars or sail, shall have ready at hand a lantern showing a white light, which shall be temporarily exhibited in sufficient time to prevent collision."

It is desirable that rowing boats shall be equipped with a lantern at night, to be temporarily displayed in time to warn larger vessels of their whereabouts in the event of danger of collision. But it is also desirable that this lantern should be as simple and inexpensive as possible. If rowing boats were included constructively in article 7 as it stood, they would be required to carry the red and green lantern provided in the third subdivision.

This would impose expense upon those using rowing boats, which would be burdensome. It would also be difficult to enforce a law requiring rowing boats to be equipped with bicolored lanterns. The whereabouts of a rowing boat ahead, indicated by a white lantern, shown temporarily, is all that is essential for an approaching vessel to know. It is not essential that the port and starboard sides of a rowing boat be indicated by the colored lights assigned to such sides.

If rowing boats were not included, constructively, in article 7, as it stood, it is desirable that they should be, for obvious reasons.

ARTICLE 9.

The reasons for the repeal of article 9 are set forth in Senate Report No. 364 (Calendar No., 412) to accompany S. 1965.

ARTICLE 21.

The amendment to article 21 consists in the addition of the note:

"ARTICLE 21. Where, by any of these rules, one of two vessels is to keep out of the way, the other shall keep her course and speed.

"NOTE.—When, in consequence of thick weather or other causes, such vessel finds herself so close that collision can not be avoided by the action of the giving-way vessel alone, she also shall take such action as will best aid to avert collision." (*See* articles 27 and 29.)

The substance of this note has been declared by courts to be an obligation "paramount over all statutory rules." The delegates from the United States to the International Marine Conference urged its adoption on the ground that so fundamental a rule should be incorporated in a written code for the guidance of marines. For various reasons the delegates from the United States were outvoted on this proposition by foreign nations in the conference. (The discussion in the conference on the subject is to be found in Vol. II, pp. 1204–1215, inclusive, of the Proceedings of the Conference.) As foreign nations have now recognized the advisability of placing the note in the regulations, there is additional reason why Congress should enact the proposition of the American delegates.

ARTICLE 31.

The amendments to article 31, relating to distress signals, are:

A. The first subdivision of distress signals both for day and night is amended to read:

"First. A gun *or other explosive signal* fired at intervals of about a minute."

The periodic explosive signal is what is essential to indicate distress. Whether it be made with a gun or by some other means is immaterial.

B. In the signals by daytime the fourth subdivision is omitted.

[Fourth. Rockets or shells as prescribed below for use at night.]

These signals are obviously of limited use by daylight and the omission is regarded as immaterial.

C. In the third subdivision of night distress signals the bracketed words are omitted.

"Third. Rockets or shells [bursting in the air with a loud report and] throwing stars of any color or description, fired one at a time at short intervals."

The omission is not regarded as material.

You have already a copy of the letter of Rear-Admiral Franklin, U. S. Navy, who was president of the Washington Conference, cordially endorsing the bill. I inclose copies of letters from Commodore Sampson, U. S. Navy, and M. S. I. Kimball, superintendent of the Life-Saving Service, who were delegates from this country to the conference, also urging the passage of the bill. I have written to the remaining delegates from this country to the conference, and hope to transmit copies of their approval for your aid in a few days.

If the code is to go into effect next March, as seems to be the desire of the nations concerned, it is desirable that these amendments be passed at the early convenience of Congress, so that the regulations can be printed in their entirety for the guidance of mariners as soon as practicable.

I know of no other measure which is regarded as of such usefulness by the merchant service of the civilized world.

Sincerely, yours,

EUGENE T. CHAMBERLAIN.

Hon. STEPHEN M. WHITE,
U. S. Senate.

DEPARTMENT OF THE NAVY, BUREAU OF ORDNANCE,
Washington, D. C., May 3, 1894.

SIR: (1) I have just received your letter of May 1 with inclosures, and hasten to express my concurrence in the changes proposed by the British Government to the rules of the road as prescribed by the Washington conference.

(2) I see no objection to the modification of article 7 in favor of small boats, as proposed in Change A. Change B was discussed in the conference and strongly advocated by many of the delegates. The same remark applies to Change C. Change D was probably recommended because the signals proposed to be omitted are not well suited for use in the daytime, but it may be found that omitting them will restrict the power of small vessels to make distress signals. Change E appears unimportant.

(3) I congratulate you upon getting this matter before Congress, and trust that it will be brought to a successful and speedy conclusion.

Respectfully,

W. T. SAMPSON,
Chief of Bureau of Ordnance.

Hon. EUGENE T. CHAMBERLAIN,
Commissioner of Navigation, Treasury Department.

TREASURY DEPARTMENT, *May 3, 1894.*

SIR: I have examined the proposed amendments to the act of August 19, 1890, to prevent collisions at sea, to which you have called my attention, and am in favor of their enactment. They appear desirable in themselves and on comparison are found to be identical with amendments to the recommendations of the International Marine Conference, proposed by the British Government and accepted, as I am informed, by other maritime powers.

The passage of these amendments by Congress will enable the United States to join the other maritime powers in putting into operation next year the improved international regulations to prevent collisions at sea, proposed by the Washington conference of 1889; a step which I may be permitted to say, as a delegate to that conference, will, in my judgment, add greatly to the security of life and property at sea.

An early passage of the amendments would afford to the officers of vessels opportunity to acquaint themselves with the new rules before they would go into effect.

Very truly, yours,

S. I. KIMBALL,
Superintendent Life-Saving Service.

COMMISSIONER OF NAVIGATION,
Treasury Department.

INTERNATIONAL NAVIGATION COMPANY,
Jersey City, May 5, 1894.

DEAR SIR: Your letter of May 1 to the delegates representing the United States at the International Maritime Conference, in 1889, for preventing collisions at sea, received this morning and carefully noted.

As you will see by my letter of April 6, Appendix D, Report 364, Calendar 412, I entirely agree with the other delegates as to the improbability of article 9 being accepted by the nations represented, and concur in the proposition that it be repealed.

Change A.—Addition (section 4) to article 7.

Although the majority of the delegates at the International Conference were opposed to this rule, personally I was in favor of it, and think the addition an improvement.

Change B.—I can not see the slightest objection to this change, although it appears to me that the addition to this article is entirely unnecessary. It merely instructs the shipmaster or officer in command to act on his own judgment when there is imminent danger of collision in thick weather. This responsibility, I think it is understood, the shipmaster is always to take, and I believe the regulations are so interpreted by the courts.

Changes C, D, and E.—In my opinion these changes are decided improvements, as explosive signals have almost entirely taken the place of guns on the mail and passenger steamers of the mercantile marine.

Yours, truly,

J. W. SHACKFORD.

Hon. EUGENE T. CHAMBERLAIN,
Commissioner of Navigation, Washington, D. C.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 420.

IN THE SENATE OF THE UNITED STATES.

MAY 19, 1894.—Ordered to be printed.

Mr. BLANCHARD, from the Committee on Indian Affairs, submitted the following

REPORT:

[To accompany S. 934.]

The Committee on Indian Affairs, to whom was referred the bill (S. 934) "for the relief of the Chapter of Calvary Cathedral, Sioux Falls, South Dakota," having duly considered the same, report it back with the recommendation that it do pass.

In support of this recommendation your committee make the following statement of the case:

On July 1, 1891, T. J. Morgan, Commissioner of Indian Affairs, entered into a contract with John S. Lewis, treasurer of the Cathedral Chapter of Sioux Falls, S. Dak., to equip, maintain, and manage an industrial boarding school at Springfield, S. Dak., and in the same to care for and educate an average of 45 Indian pupils.

The duration of this contract was until June 30, 1892.

"The Cathedral Chapter of Sioux Falls, South Dakota," (as treasurer of which Lewis signed the contract) is identical with "the Chapter of Calvary Cathedral, Sioux Falls, South Dakota," for whose relief the present bill was introduced.

This Chapter of Calvary Cathedral, Sioux Falls, was the board of trustees of the Episcopal Church in South Dakota.

The contract referred to was made by the Government with Lewis, as treasurer aforesaid, at the request of the Rt. Rev. W. H. Hare, Episcopal bishop of South Dakota, and this was known to the Commissioner of Indian Affairs. Bishop Hare was acting for the Niobrara deanery and the board of trusts of the Episcopal Church of South Dakota. The contract was formally made with Lewis as treasurer of the Chapter of Calvary Cathedral, because the latter was a corporation and authorized to contract. Bishop Hare was president of the chapter of Calvary Cathedral.

John S. Lewis, treasurer, shortly afterwards fell into bad ways, took to drink, etc., and during the absence of Bishop Hare in Japan he (Lewis) appropriated to his own use several drafts, amounting to over $2,000.

Bishop Hare returned from Japan in April or May, 1892, and, discovering the condition of affairs alluded to above, requested the resignation of Lewis as treasurer of the Chapter of Calvary Cathedral. This resignation occurred in May, 1892.

Thereupon Bishop Hare immediately gave notice to the U. S. Indian agent at Santee, whose duty it was to make out the vouchers under this contract to the Commissioner of Indian Affairs and to the Treasurer of the United States, that John S. Lewis had ceased to be the

treasurer, and, that George W. Lewis, of Sioux Falls, had been appointed in his place. Bishop Hare signed these notifications as president of the Chapter of Calvary Cathedral, Sioux Falls. Several other notices of this resignation and substitution were incidentally sent to the Indian Department during the ensuing five or six months.

Notwithstanding all this the U. S. Treasurer, late in June, 1892, remitted to John S. Lewis, treasurer of the Chapter of Calvary Cathedral, a draft for $2,430, being amount due for two quarters ending, respectively, December 30, 1891, and March 30, 1892.

This draft John S. Lewis had cashed, embezzled the proceeds, and disappeared. No portion of the money was ever turned over by him for the support of the Indian school, nor could the amount of the draft, or any part of it, have been collected by suit at law against him.

This embezzlement caused the Indian school great embarrassment. Bishop Hare, immediately upon the discovery that the Treasury Department had ignored the notices of John S. Lewis's resignation, had sent the draft to the latter, and that its proceeds had been embezzled by him, communicated with the Commissioner of Indian Affairs and the U. S. Treasurer, giving the full facts of the case, and requesting that the amount due the chapter of Calvary Cathedral for the two quarters mentioned be paid to George W. Lewis, treasurer.

The Commissioner of Indian Affairs referred the bishop's letter to the Second Auditor of the Treasury. That officer on the 3d of August, 1892, in a letter to the bishop, took the position that the contract was not made with the chapter of Calvary Cathedral, but with John S. Lewis personally, and that his signature as treasurer, etc., was simply descriptive and could affect no one but himself. He held that the payment to John S. Lewis, treasurer, acquitted the Government, and declined to recognize the claim made by Bishop Hare for payment to the chapter of Calvary Cathedral of the amount due for the two quarters heretofore mentioned.

Admitting, for the sake of argument, that the position of the Second Auditor is technically correct as to the contract, made in the form it was, being one on its face, with John S. Lewis personally, and that his signature as treasurer, etc., was simply descriptive, the defect must be considered cured by the repeated notices given, subsequent to the signing of the contract, to the Commissioners of Indian Affairs and the Treasury officials, by Bishop Hare and George W. Lewis, who had been appointed treasurer in place of John S. Lewis. These notices must be held as sufficient, not only of the fact of John S. Lewis's resignation as treasurer of the Cathedral Chapter, but also of the fact *that the contract was not made with him personally, but with him in the capacity as treasurer of the Cathedral Chapter.*

Your committee think that heed should have been given to these notices by the Commissioner of Indian Affairs and the Treasury officials; that the draft for $2,430 should not have been made payable to the order of John S. Lewis, treasurer, or remitted to him, and that in pursuing a contrary course gross negligence was committed.

By sending the draft to John S. Lewis, after notice that he had resigned as treasurer, put it in his power to defraud the Chapter of Calvary Cathedral, and he took advantage of this circumstance to defraud the cathedral.

The United States, in equity, common justice, and, we think, law, must be held liable.

We append hereto the statement of the case submitted by Bishop Hare and other accompanying papers.

SIOUX FALLS, S. DAK., *May 14, 1892.*

SIR: I hereby certify you that John S. Lewis, late treasurer of the Chapter of Calvary Cathedral, Sioux Falls, in whose name a contract was drawn up for the current year for conducting Hope Indian boarding school, Springfield, S. Dak., has resigned, and that *George W. Lewis, Sioux Falls, S. Dak.*, has been appointed in his place.

Yours, respectfully,

W. H. HARE,
President of the Chapter of Calvary Cathedral.

The COMMISSIONER OF INDIAN AFFAIRS.

SIOUX FALLS, S. DAK., *May 20, 1892.*

SIR: I beg leave to submit herewith original vouchers with quarterly reports for tuition, etc., at Hope Indian Boarding School, for second quarter and for third quarter 1892, for which I beg a favorable consideration.

I regret delay in forwarding these documents which has been caused by a change of officers, the undersigned having succeeded John S. Lewis.

Very respectfully, yours,

GEO. W. LEWIS,
Treasurer of the Chapter of Calvary Cathedral.

The COMMISSIONER OF INDIAN AFFAIRS,
Washington, D. C.

Bishop Hare begs leave to draw the attention of the honorable Commissioner to the above, and to say that it would be a great relief to the management of the school if, in view of past delay, this account could receive prompt attention. The delay has not been occasioned by any delinquency on the part of the school management.

W. H. HARE, *Bishop.*

SIOUX FALLS, S. DAK., *July 23, 1892.*

SIRS: About the middle of May, 1892, I, as president of the chapter of Calvary Cathedral at Sioux Falls, S. Dak., officially informed the Treasurer of the United States and the Commissioner of Indian Affairs that John S. Lewis, treasurer of the chapter of Calvary Cathedral, with whom the United States had a contract for conducting an Indian boarding school at Springfield, S. Dak., had resigned his office, and that George W. Lewis had been appointed in his place. On May 20, George W. Lewis, treasurer, mailed the following letter to the honorable Commissioner of Indian Affairs:

"SIOUX FALLS, S. DAK., *May 20, 1892.*

"The COMMISSIONER OF INDIAN AFFAIRS:

"SIR: I beg leave to submit herewith original vouchers, with quarterly reports for tuition, etc., at Hope Indian boarding school for second quarter and for third quarter for 1892, for which I beg a favorable consideration.

"I regret delay in forwarding these documents, which has been caused by a change of officers, the undersigned having succeeded John S. Lewis, treasurer of the Chapter of Calvary Cathedral.

"Bishop Hare begs leave to draw the attention of the honorable Commissioner to the above, and to say that it would be a great relief to the management of the school if, in view of the delay, this account could receive prompt attention. The delay has not been occasioned by any delinquency on the part of the school.

"GEORGE W. LEWIS,
"*Treasurer Chapter Calvary Cathedral.*"

Notwithstanding these notifications, an official notice reached Sioux Falls in an envelope addressed to John S. Lewis, treasurer, and signed by the Acting Commissioner, under date of May 27, in the foregoing matters. I returned the envelope to the Commissioner of Indian Affairs, and drew attention to the fact that I had previously notified him that John S. Lewis had ceased to be the treasurer of the Chapter of Calvary Cathedral and that George W. Lewis had been appointed in his stead. Under date of June 3, 1892, I also mailed a letter to the U. S. Treasurer, of which the following is a copy:

"SIOUX FALLS, S. DAK., *June 3, 1892.*

"SIR: The United States has a contract for conducting Hope Indian boarding school at Springfield, S. Dak., with John S. Lewis, treasurer of Chapter of Calvary Cathedral at Sioux Falls.

"In view of a change in the treasurer, will you do me the favor to inform me what payments have been made since the quarter ending March 31, 1891?

"W. H. HARE,
"*President of Chapter of Calvary Cathedral.*

"The U. S. TREASURER."

In spite of all these precautions, I have just been informed that a draft for $2,430, under date of about June 22, 1892, was issued by the U. S. Treasury Department to John S. Lewis, for the tuition of the Indian pupils at said school for the six months ending March 31, 1892; that the same was received by John S. Lewis and cashed by him at a bank in this city, on the 29th day of June, 1892; that immediately thereafter he left the city; that he was seen in Chicago about the 9th day of July, but has not been heard from since; that the proceeds of this draft he appropriated to his own use, and that no portion of it has been turned over by him for the support of said school. His affairs here are in such a condition that there is no likelihood of his future return to this city. The Hope Indian Boarding School is greatly embarrassed by reason of the lack of funds due it from the Government for the six months ending March 31, 1892, and I earnestly trust that you will cause the amounts due the school for such period to be transmitted at your earliest convenience to the proper officer, viz, George W. Lewis, treasurer of the Chapter of Calvary Cathedral at Sioux Falls, S. Dak. I regret exceedingly that this draft should have been issued to the wrong person, but the Chapter of Calvary Cathedral can not, of course, be chargeable with any payments made to its treasurer after notice of his resignation and the appointment of his successor was duly given to the proper officers at Washington.

Yours, respectfully,

W. H. HARE,
Bishop and President.

The U. S. TREASURER and the COMMISSIONER OF INDIAN AFFAIRS,
Washington, D. C.

TREASURY DEPARTMENT, OFFICE OF THE SECOND AUDITOR,
Washington, D. C., August 3, 1892.

SIR: Your communication of the 23d ultimo, addressed to the Commissioner of Indian Affairs, in regard to claim of John S. Lewis, treasurer of Cathedral Chapter, for tuition, etc., of Indian pupils at Hope School, Springfield, S. Dak., during the six months ending March 31, 1892, amounting to $2,430, has been referred to this office.

You state that about the middle of May last you notified the Commissioner of Indian Affairs and the U. S. Treasurer that John S. Lewis had resigned his position as treasurer of the Chapter of Calvary Cathedral, and that George W. Lewis had been appointed in his place.

You state further that notwithstanding these precautions a draft for $2,430 was issued by the Treasury Department in favor of John S. Lewis, for tuition etc., of Indian pupils at Hope School for the six months ending March 31, 1892, and that the said Lewis cashed the draft and has now left your city, and that there is no likelihood of his return.

And you request that the amount due the chapter of Calvary Cathedral for tuition, etc., as above, be forwarded to George W. Lewis, its present treasurer.

Your letter is evidently written under a complete misapprehension of the facts in this case.

There is nothing due, nor has there been anything due, from the United States to the chapter of Calvary Cathedral for tuition of Indian pupils. The chapter of Calvary Cathedral has no contract with the United States for tuition of Indian pupils, and has had none.

July 1, 1891, a contract was made between T. J. Morgan, on behalf of the United States, and John S. Lewis, treasurer of the Cathedral Chapter of South Dakota, by which the said John S. Lewis agreed to care for and educate a certain number of Indian pupils at Springfield, S. Dak., and the United States agreed to pay him for such services at an agreed rate.

The contract was not made with the chapter of Calvary Cathedral, nor with the Cathedral Chapter of Southern Dakota, nor with John S. Lewis, acting on behalf of that body, if the two names refer to the same body, or on behalf of either of them, if they are not the same; but with John S. Lewis personally. The fact that Lewis signed the contract as treasurer of Cathedral Chapter did not bind the chapter in any way to fulfil the contract, nor did it bind the United States to make payments to the chapter, nor to any of its officers, authorized or unauthorized, nor to pay any attention to any changes in the personnel of its official force. His signature as treas-

urer, etc., was simply descriptive and could affect no one but himself. Had the contract been made with Cathedral Chapter, in which case whatever official had signed in behalf of the chapter would have been required to furnish evidence as to his right to sign, the chapter would of course have been entitled to designate the person to receive and receipt for money due.

But, as has already been stated, the contract was simply with John S. Lewis, who described himself as treasurer of a certain institution or corporation. He might have described himself as an officer of any other corporation without altering the fact that the contract was with him alone.

The accounting officers had no information, official or otherwise, that the Hope School at Springfield was managed or controlled by the Cathedral Chapter of Sioux Falls. They did know that John S. Lewis, signing his name as an official of that body, had a contract to furnish tuition, etc., for Indian pupils at Springfield, and that upon his furnishing vouchers and proper evidence that he had fulfilled his part of the contract he was entitled to payment therefor.

Vouchers in his favor for the six months ending March 31, 1892, in due form, certified to by the U. S. Indian agent at Santee Agency, and by the principal of the school, were filed with the accounting officers, and the latter, in accordance with the law and regulations, directed issue of the draft to the contractor, John S. Lewis, superintendent, etc.

It will be seen from the above statement that whatever claim the Cathedral Chapter may have against its late treasurer, it certainly can have none against the United States.

Respectfully, yours,

I. N. P.,
Auditor.

Bishop W. H. HARE,
President Chapter of Calvary Cathedral, Sioux Falls, S. Dak.

TREASURY DEPARTMENT, OFFICE OF SECOND AUDITOR,
Washington, D. C., September 23, 1892.

SIR: The claim of John S. Lewis, for tuition, etc., of Indian pupils at Hope Boarding School, Springfield, S. Dak., during quarter ending June 30, 1892, amounting to $1,144.97, is herewith returned.

This claim is made under the contract with John S. Lewis, of July 1, 1891; nor is there anything in the papers to show either that he did not perform his part of the contract or why payment should not be made to him, the account being stated in his name and the Indian agent's certificate indicating performance of contract by him and that the sum claimed is due him. Yet on the "jacket" of transmittal is stated: "Payment to be made to George W. Lewis, treasurer of Cathedral Chapter, Springfield, S. Dak."

This is done, it is presumed, because of a statement of Bishop W. H. Hare, president of Chapter of Calvary Cathedral, Sioux Falls, S. Dak., dated July 23, 1892, and on file with settlement 6691 of June 10, to the effect that John S. Lewis had gone to parts unknown, and that George W. Lewis had been appointed treasurer of the chapter in his stead.

The statement referred to was received here August 3, by reference from your office, and further stated that the $2,430 paid on above settlement for the second and third quarters, 1892, had been received by John S. Lewis and retained by him; and the bishop requested that the United States should pay the amount to the new treasurer.

This office, on the same date, advised Bishop Hare that the United States knew no second party to the contract but John S. Lewis, whose title of treasurer, etc., was merely descriptive, the contract being with him personally; that the cathedral chapter is unknown to the Government as a party to the contract, and that, therefore, the request could not be complied with.

This ruling, which is in accordance with well-known principles of law, must govern the present case, unless it can be shown that the contractor neglected or omitted to perform his part of the contract, evidence to which effect would justify the accounting officers in disallowing the claim, but under no circumstances can money accruing under a contract with John S. Lewis be paid to George W. Lewis, or any other person, the law even forbidding assignments prior to the date of the warrant. The request to pay to the new treasurer can not, therefore, be complied with.

This office, however, will offer no obstacle to the settlement of a claim in favor of George W. Lewis, or other third party designated by the chapter, for services in furnishing tuition, etc., during the fourth quarter, 1892, as an open-market transaction sanctioned by the Secretary of the Interior, provided that satisfactory evidence of noncompliance with contract on the part of John S. Lewis be filed; as, whether stipulated in the contract or not, it must be held to be the right and duty of the

administrative department to purchase services or supplies necessitated by the negligence of a defaulting contractor. But it would be absurd to hold the Government responsible because a corporation chooses to do its business with the Government through an individual who turns out to be dishonest. If the cathedral chapter suffers because the contractor was one of its officers it must bear the consequence of its unfortunate selection.

Respectfully, yours,

J. N. PATTERSON,
Auditor.

The COMMISSIONER ON INDIAN AFFAIRS.

STATEMENT.

Until a few years ago the appropriation of the board of managers of the domestic and foreign missionary society to the Niobrara Deanery had been sufficient to provide for the 4 boarding schools—St. Paul's, St. Mary's, St. John's and Hope—and for the general missionary work among the Indians. At this time a reduction in the missionary appropriation was made, amounting to about $3,000, and it was found necessary to discontinue one of the boarding schools, or to seek assistance in a contract with the United States. The latter alternative was resorted to, and a contract was made at my request by the Government with J. S. Lewis, treasurer of the Chapter of Calvary Cathedral, this being the board of trusts of the Episcopal Church in South Dakota. This was accordingly done.

During my absence in Japan last winter John S. Lewis, treasurer, appropriated to his own use several drafts, amounting to over $2,000, and had brought himself by the use of strong drink into a condition which rendered him incompetent to attend to business. At my request, on my return from Japan, he resigned in May, 1892, his office as treasurer of the Chapter of Calvary Cathedral.

I immediately gave notice to the principal of Hope School, to the U. S. Indian agent at Santee, whose duty it is to make out the vouchers, to the Commissioners of Indian Affairs, and to the Treasurer of the United States that John S. Lewis had ceased to be treasurer, and that George W. Lewis, of Sioux Falls, had been appointed in his place, signing the notification as president of the Chapter of Calvary Cathedral, Sioux Falls. Several other notices were incidentally sent to the Indian Department during the ensuing five or six weeks.

Notwithstanding these notifications the U. S. Treasury, late in June, 1892, remitted to John S. Lewis, treasurer of the Chapter of Calvary Cathedral, a draft for $2,430, being the amount due for two quarters ending respectively, December 30, 1891, and March 30, 1892.

This draft John S. Lewis cashed and embezzled and disappeared.

As soon as I discovered this defalcation I sought legal counsel, and then addressed to the Indian and Treasury Departments the following letter:

SIOUX FALLS, S. DAK., *July 23, 1892.*

The U. S. TREASURER and the COMMISSIONER OF INDIAN AFFAIRS,
Washington, D. C.:

SIRS: About the middle of May, 1892, I, as president of the chapter of Calvary Cathedral at Sioux Falls, S. Dak., officially informed the Treasurer of the United States and the Commissioner of Indian Affairs that John S. Lewis, treasurer of the chapter of Calvary Cathedral, with whom the United States had a contract for

conducting an Indian boarding school at Springfield, S. Dak., had resigned his office and that Gegrge W. Lewis had been appointed in his place. On May 20, George W. Lewis, treasurer, mailed the following letter to the honorable Commissioner of Indian Affairs:

"SIOUX FALLS, S. DAK., *May 20, 1892.*

"The COMMISSIONER OF INDIAN AFFAIRS:

"SIR: I beg leave to submit herewith original vouchers, with quarterly report, for tuition, etc., at Hope Indian Boarding School for second quarter and for third quarter of 1892, for which I beg favorable consideration.

"I regret delay in forwarding these documents, which has been caused by a change of officers, the undersigned having succeeded John S. Lewis, treasurer of the chapter of Calvary Cathedral.

"GEORGE W. LEWIS,
"*Treasurer of the Chapter of Calvary Cathedral.*"

"P. S.—Bishop Hare begs leave to draw the attention of the honorable Commissioner to the above, and to say that it would be a great relief to the management of the school if, in view of the delay, this account could receive proper attention. The delay has not been occasioned by any delinquency on the part of the school."

Notwithstanding these notifications, an official notice reached Sioux Falls in an envelope addressed to John S. Lewis, treasurer, and signed by the Acting Commissioner, under date of May 27, in the foregoing matter. I returned the envelope to the Commissioner of Indian Affairs and drew attention to the fact that I had previously notified him that John S. Lewis had ceased to be treasurer of the chapter of Calvary Cathedral and that George W. Lewis had been appointed instead. Under date of June 3, 1892, I also mailed a letter to the U. S. Treasurer, of which the following is a copy:

"SIOUX FALLS, S. Dak., *June 2, 1892.*

"SIR: The United States has a contract for conducting Hope Indian Boarding School at Springfield, S. Dak., with John S. Lewis, treasurer of the chapter of Calvary Cathedral at Sioux Falls.

"In view of the change of the treasurer, will you do me the favor to inform me what payments have been made since the quarter ending March 31, 1891?

"W. H. HARE,
"*President of the Chapter of Calvary Cathedral.*

"The U. S. TREASURER."

In spite of all these precautions, I have just been informed that a draft for $2,430 under date of about June 22, 1892, was issued by the U. S. Treasury Department to John S. Lewis, for the tuition of Indian pupils at said school for the six months ending March 31, 1892. That the same was received by John S. Lewis and cashed by him at a bank in this city on the 29th day of June, 1892; that immediately thereafter he left the city; that he was seen in Chicago about the 9th of July, but has not been heard from since; that the proceeds of this draft he appropriated to his own use, and that no portion of it has been turned over by him for the support of said school. His affairs here are in such a condition that there is no likelihood of his future return to this city. The Hope Indian boarding school is greatly embarrassed by reason of a lack of funds due it from the Government for the six months ending March 31, 1892, and I earnestly trust that you will cause the amount due the school for such period to be transmitted at your earliest convenience to the proper officer, viz, George W. Lewis, treasurer of the chapter of Calvary Cathedral at Sioux Falls, S. Dak. I regret exceedingly that this draft should have been issued to the wrong person, but the chapter of Calvary Cathedral can not, of course, be chargeable with any payments made to its treasurer after notice of his resignation and the appointment of his successor was duly given to the proper officers at Washington.

Yours, respectfully,

W. H. HARE.

To this letter answer has been made as follows:

DEPARTMENT OF THE INTERIOR, OFFICE OF INDIAN AFFAIRS,
Washington, August 3, 1892.

SIR: Referring to your letter of the 23d ultimo, relative to the payment of claims for tuition, etc., at Hope Indian boarding school for the second and third quarters, 1892, and which you say was erroneously paid to John S. Lewis, treasurer of Calvary Cathedral, I have to say that this office contracted with John S. Lewis, treasurer of Calvary Cathedral, and all vouchers submitted so far, even the unsettled one for the fourth quarter, now remaining in this office, has been stated in the name of *John S. Lewis, treasurer*, who is mentioned as such in the certificate of U. S. Indian Agent Helms, attached to each voucher.

Moreover there is no evidence in the possession of this office to show that you are president of Calvary Cathedral, and are authorized to notify the public of changes in your officers.

However, I will take pleasure in referring your letter and notice to the honorable Second Auditor for such action as he may deem proper to take in the case.

Very respectfully,

T. J. MORGAN,
Commissioner.

Rev. W. H. HARE,
Sioux Falls, S. Dak.

TREASURY DEPARTMENT,
OFFICE OF THE SECOND AUDITOR,
Washington, D. C., August 3, 1892.

SIR: Your communication of the 23d ultimo, addressed to the Commissioner of Indian Affairs, in regard to claim of John S. Lewis, treasurer of Calvary Cathedral, for tuition, etc., of Indian pupils at Hope school, Springfield, S. Dak., during the six months ending March 31, 1892, amounting to $2,430, has been referred to this office.

You state that about the middle of May last you notified the Commissioner of Indian Affairs and the U. S. Treasurer that John S. Lewis had resigned his position as treasurer of the chapter of Calvary Cathedral, and that George W. Lewis had been appointed in his place.

You state that, nothwithstanding these precautions, a draft of $2,430 was issued by the Treasury Department in favor of John S. Lewis, for tuition, etc., of Indian pupils at Hope school for the six months ending March 31, 1892, and that the said Lewis cashed the draft and has now left your city and that there is no likelihood of his return, and you request that the amount due the chapter of Calvary Cathedral for tuition as above be forwarded to George W. Lewis, its present treasurer.

Your letter is evidently written under a complete misapprehension of the facts of this case.

There is nothing due, nor has there been anything due, from the United States to the chapter of Calvary Cathedral for tuition of Indian pupils. The chapter of Calvary Cathedral has no contract with the United States for tuition of Indian pupils, and has had none.

July 1, 1891, a contract was made between T. J. Morgan, on behalf of the United States, and John S. Lewis, treasurer of the Cathedral Chapter of South Dakota, by which said John S. Lewis agreed to care for and educate a certain number of Indian pupils at Springfield, S. Dak., and the United States agreed to pay him for such services at an agreed rate.

The contract was not made with the chapter of Calvary Cathedral, nor with the Cathedral Chapter of South Dakota, nor with John S. Lewis acting on behalf of that body, if the two names refer to the same body, or on behalf of either of them, if they are not the same, but with John S. Lewis personally. The fact that Lewis signed the contract as treasurer of the Cathedral Chapter did not bind the chapter in any way to fulfill the contract, nor to any of its officers, authorized or unauthorized, nor to pay any attention to changes in the personnel of its official force. His signature as treasurer, etc., was simply descriptive and could affect no one but himself. Had the contract been made with the Cathedral Chapter, in which case whatever official signed himself in behalf of the chapter would have been required to furnish evidence as to his right to so sign, the chapter would, of course, have been entitled to designate the person to receive and receipt for money due.

But, as has already been stated, the contract was simply with John S. Lewis, who described himself as treasurer of a certain institution or corporation. He might have described himself as an officer of any other corporation, without altering the fact that the contract was with him alone. The accounting officer had no information, official or otherwise, that the Hope School at Springfield was managed or controlled by the Cathedral Chapter of Sioux Falls. They did not know that John S. Lewis, signing his name as an official of that body, had a contract to furnish tuition, etc., for Indian pupils at Springfield, and that upon his furnishing vouchers and proper evidence that he had fulfilled his part of the contract, he was entitled to payment therefor.

Vouchers in his favor for the six months ending March 31, 1892, in the form certified to by the U. S. Indian agent at Santee Agency, and by the principal of the school, were filed with the accounting officer, and the latter, in accordance with the law and regulations, directed issue of the draft to the contractor, John S. Lewis, superintendent, etc.

It will be seen from the above statement that whatever claim the Cathedral Chapter may have against the late Treasurer, it certainly can have none against the United States.

Respectfully, yours,

J. N. PATTERSON,
Auditor.

Bishop W. H. HARE,
President, Chapter of Calvary Cathedral, Sioux Falls, S. Dak.

These replies seemed to me most unsatisfactory; for, in the first place, I was well known as a reputable citizen who would not send such a notice as I had sent as a mere piece of impertinence; in the second place, the contract was originally begun and had each year been renewed at my instance, and had been the subject of not infrequent correspondence with me; in the third place, J. S. Lewis has generally been addressed by the officials of the United States in the course of the business as "Treasurer," or "Treasurer of the chapter of Calvary Cathedral;" in the fourth place, if "J. S. Lewis, Treasurer of the chapter of Calvary Cathedral," the party of the second part is to be regarded as acting as J. S. Lewis, a private individual, why is not "J. T. Morgan, Commissioner of Indian Affairs," the party of the first part, to be regarded as acting as a private individual? It is a case of *reductio ad absurdum*.

W. H. HARE.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 425.

IN THE SENATE OF THE UNITED STATES.

MAY 21, 1894.—Ordered to be printed.

Mr. LODGE, from the Committee on Organization, Conduct, and Expenditures of the Executive Departments, submitted the following

REPORT:

[To accompany amendment intended to be proposed to H. R. 7097.]

The Committee on Organization, Conduct, and Expenditures of the Executive Departments, to whom was referred the amendment intended to be proposed by Mr. Lodge to the bill (H. R. 7097) making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year ending June 30, 1895, and for other purposes, having considered the same, make a favorable report thereon, and recommend that it be referred to the Committee on Appropriations.

The reasons for this amendment are obvious. The duties devolved upon the joint commission in the legislative act of 1894 come properly and entirely, so far as the Senate is concerned, within the functions of the Committee on Organization, Conduct, and Expenditures of the Executive Departments. When there is a standing committee of the Senate it does not seem the proper course to take its legitimate work from it and give it to a special commission without strong reasons. None are alleged, and there can be no good reason in this case. The organization of the House committees is entirely different in regard to the subject-matter embraced in the work of the commission, and as this provision originated in the House, it was doubtless made with regard to the situation there to avoid the reference of these bills to so many different committees on the organization of the several Executive Departments. In the Senate, however, one committee embraces the whole work of the commission, and it is economy of time and labor not to duplicate hearings on the same subject-matter before the commission and a committee. Both are practically the same in their methods of consideration and action, and it is better to place the work and responsibility for these measures upon the proper standing committee of the Senate than to divide and duplicate it. It involves no change on the part of the House commission for the reasons above stated. The Committee, or the Subcommittee, on Organization, Conduct, and Expenditures of the Executive Departments can act jointly with the House commission in the same way that the Senate commission does now.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 431.

IN THE SENATE OF THE UNITED STATES.

MAY 24, 1894.—Ordered to be printed.

Mr. MANDERSON, from the Committee on Printing, submitted the following

REPORT:

[To accompany House concurrent resolution to print 5,500 copies of the Annual Report of the Chief of the Weather Bureau, for the year ended June 30, 1893; 1,000 for use of Senate, 2,000 for use of House, and 2,500 for use of the Weather Bureau.]

The Committee on Printing, to whom was referred the accompanying resolution, having considered the same, report it back with an amendment, and as amended recommend that it pass.

AMENDMENT PROPOSED.

In line 6 strike out "June thirtieth" and insert "December thirty-first."

This amendment is necessary to properly describe the document to be printed, as the annual reports of the Weather Bureau are made for the calendar year, and not for the fiscal year as the resolution, without amendment, would indicate.

The Public Printer estimates the cost at $3,065.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 432.

IN THE SENATE OF THE UNITED STATES.

MAY 24, 1894.—Ordered to be printed.

Mr. DANIEL, from the Committee on Claims, submitted the following

REPORT:

[To accompany S. 454.]

The Committee on Claims, to whom was referred the bill (S. 454) entitled "A bill for the relief of Washington College (now known as Washington and Lee University), located at Lexington, Va.," respectfully report the same with a substitute by way of amendment and recommend that the substitute do pass. This substitute does not materially alter the bill except so far as to express with greater clearness the true intent and meaning thereof as your committee understand it.

This measure provides for the reimbursement to this institution for the injury to its buildings, apparatus, libraries, and other property injured or destroyed by troops of the United States during the late war to an amount not exceeding $17,484, as the accounting officers of the Treasury may find to be duly proven on account of such injury and destruction. The fact of the injury to the college and the amount thereof appears to be well established by the memorial of William McLaughlin, the rector, and the evidences submitted therewith. The damage referred to was inflicted by U. S. troops under Gen. David Hunter, who entered the town of Lexington on June 11, 1864. The college was at that time in operation and the professors and students engaged in the peaceful pursuits of learning. The U S. troops occupied the grounds and buildings, a battery of artillery was parked on the campus, the horses occupied the dormitories, and Gen. Crook had his headquarters on the college grounds. During three days of occupancy the buildings were dismantled, the apparatus destroyed and the libraries mutilated.

In June, 1865, a committee of the board of trustees of the college, consisting of J. D. Davidson, a lawyer of Lexington of high standing, and Judge John W. Brockenbrough, whose eminence as a jurist and man of honor is well known, submitted a report to the board of trustees of the college, setting forth that they carefully examined the college buildings in July, 1865, in company with Col. T. McLeister, the U. S. officer then commanding the post, and submitted the estimate made by the college faculty of the damage done to its buildings and their contents by Gen. Hunter's army in June, 1864. Col. McLeister, the post commander, certifies that he accompanied the committee and examined the injury done to the buildings and contents of the college; that the examination made in his presence was full and thorough; that the destruction of property was apparent, and that the report presents

a true statement of the extent of the damage done. He does not testify as to who did the damage, nor was he present at the time of its committal, but that it was done by the troops of Gen. Hunter is well proven by Hon. David E. Moore and Mrs. C. K. Harris, wife of one of the professors, and is a notorious fact of history that is undisputed.

Your committee approve this bill, because they believe it to be the true policy of the Government to show the utmost respect to institutions of learning that is consistent with due regard to the interests of the Government in time of war.

Washington College was elevated to its rank as such by the liberality and patriotism of Gen. George Washington. It was originally known as Augusta Academy, but about two months before the Declaration of Independance, on the 13th of May, 1776, the board of trustees changed its name to Liberty Hall, and the town in which the college is located was one of, if not the very first, that was called Lexington in honor of the battle at that place in Massachusetts. When Tarleton drove the legislature of Virginia from Charlottesville and threatened the valley a company of Liberty Hall students, commanded by its rector, William Graham, marched to Rockfish Gap with the men of the valley and, planting themselves in this mountain pass, turned back the invading columns.

In 1784 the legislature of Virginia donated to Gen. Washington, in tribute to his public services, 100 shares of stock, of the par value of $200 each, of the James River Company, a company chartered for the improvement of the navigation of the James River. Washington declined the gift, but agreed to accept it upon the condition that he might be permitted to bestow it upon Liberty Hall Academy. In the letter to the trustees who acknowledged his donation he said:

> To promote literature in the rising empire and to encourage the arts have ever been amongst the warmest wishes of my heart; and if the donation which the generosity of the legislature of the Commonwealth of Virginia has enabled me to bestow on Liberty Hall—now by your politeness called Washington Academy—is likely to prove a mean to accomplishing these ends, it will contribute to the gratification of my desires. Sentiments like those which have flowed from your pen excite my gratitude, whilst I offer my best vows for the prosperity of the academy and for the honor and happiness of those under whose auspices it is conducted.

By subsequent arrangement these shares were retired and the legislature of Virginia, in consideration thereof, agreed to pay Washington College 6 per cent on the sum of $50,000 annually forever, an obligation the State has always observed. In 1802 the Cincinnati Society of Virginia, composed of surviving officers of the revolution, dissolved their society and assigned their funds to the Washington Academy, as the institution was then called, to which, as they said, "shares of the James River Company heretofore vested in our illustrious leader and hero, Gen. Washington, have by him been appropriated," and from this donation about $25,000 was realized. These gratuities of patriotism and benevolence built up this institution, and when the war broke out it had ample buildings, apparatus, and libraries, and an endowment of nearly $100,000 derived from such sources. Its career as an educational institution was crowned with great success. Two of its alumni became judges of the Supreme Court of the United States, 2 Attorneys-General of the United States, 9 governors of States, 13 U. S. Senators, nearly 30 Representatives in Congress, 15 judges of State appellate courts, 3 foreign ministers, 18 presidents of colleges and universities, and a large number were distinguished in the various walks of life, in the learned professions, in business pursuits, and as prominent and useful members of society.

Your committee feel that in granting this reimbursement to an institution so founded and so successful in the accomplishment of good they act in accord with the patriotic sentiments which inspired Washington and his comrades in establishing and cherishing it. They do not deem it necessary to extend argument in this behalf. An institution of learning, founded by benevolence, patriotism, and liberality is the possession of society, and ought to be respected and protected in peace and in war. The greatest soldiers and statesmen have always manifested such spirit, and in an age of enlightenment and good feeling that spirit is worthy of cultivation. Every case of this kind presented to Congress must stand upon its own individual merits, nor can one case be regarded as the precedent of another, save in so far as it may indicate the benign policy of a great government to cherish and propogate the highest models of civil and military conduct.

These sentiments have been so admirably expressed and so forcibly presented in a report made by the Hon. George F. Hoar, of Massachusetts, on behalf of the Committee on Claims of the Forty-fourth Congress, first session (Report No. 203), in which it was recommended that a similar reimbursement be made to the old college of William and Mary, that we could not better support the views we present than by its quotation; and we hereunto append a copy of that report, which we regard as an honor to Congress and to its author. This report is marked Appendix A, and we append also the memorial of William McLaughlin, rector of Washington and Lee University, with the evidences submitted thereon, marked Appendix B.

APPENDIX A.

[House Report No. 203, Forty-fourth Congress, first session.]

The Committee on Education and Labor, to whom was referred the bill for the relief of the College of William and Mary, in Virginia, respectfully report:

On the 9th day of September, 1862, the principal building of the College of William and Mary was destroyed by fire. This college is in the town of Williamsburg, 35 miles from Fort Monroe, on territory which remained under the control of the United States during nearly the whole of the war. Williamsburg is situate on the narrowest part of the peninsula, partly in the county of York and partly in that of James City. York County was in the hands of the Union troops from May, 1862, to the close of the war. It was never during that time treated as rebel territory; was expressly excepted from President Lincoln's original proclamation of emancipation; it formed a part of the State of Virginia, which had for a time its seat of government at Alexandria under Governor Pierpoint; was represented in Congress and gave the necessary constitutional assent to the separation of West Virginia. The college is a little over the line in James City, but was in the town of Williamsburg, and was held by the Union forces, as was York County, and was practically Union territory as much as the rest of the town of which it formed a part.

Before the fire the United States took possession of the college building for military uses. Its rooms contained hay and other stores, and cavalry equipments. The day before the destruction of the building a court-martial was going on in it, which was not over at the time of the destruction. On the morning of May 9, after a conflict between the Union forces and a body of rebel cavalry, the latter got possession of the place for a few hours. After their withdrawal, some returning stragglers of the garrison, provoked by defeat, and under the influence of drink, set fire to the building and prevented the residents of the neighborhood from extinguishing the flames till it was wholly consumed.

The sum appropriated by the accompanying bill is somewhat less than the actual value of the building, which was erected in 1859, and is without the addition of interest.

We are of the opinion that the United States should restore the building so destroyed, for several reasons which do not apply to any other claim whatever

which can hereafter be made for the injury or destruction of property during the rebellion. The Government had taken possession of the property for its own purposes, excluding the owners and preventing them from taking any measures to secure its protection. This was on what was practically friendly and not hostile territory, and the case should be treated as if it had happened in Washington or Philadelphia.

There are other considerations which appeal most powerfully alike to reason and patriotic feeling in demanding this relief.

Every civilized nation has its hallowed spots, about which its patriotic memories cluster, and whose names rise before the imagination whenever these memories are stirred. Sometimes these spots are the scenes of famous battles, as Bunker Hill, or Saratoga, or Yorktown; sometimes the places where the foundations of great States have been laid as at Jamestown or Plymouth; sometimes where great civic events have occurred, as Independence Hall or Fanueil Hall; sometimes the dwelling places or burial places of heroes or statesmen, as Mount Vernon or Westminster Abbey; sometimes the venerable institutions of learning which have educated and trained the great benefactors of the people, as Oxford and Cambridge, Harvard, Yale, Princeton, and William and Mary. Under our form of government these hallowed spots are in the custody of States. But they hold them as trustees for the whole people, and the gratitude and affection which surround and hallow them are the gratitude and affection of the whole people. Unless this be true, the American people, alone among civilized nations, are without any common objects of national reverence.

The colleges of the period preceding the war of the Revolution were among the most potent forces in accomplishing our independence and founding our Constitution. Among them, none can claim precedence over William and Mary. The names of Washington, to whose genius in war and to whose influence in peace we owe the vindication of our liberties and the successful inauguration of our Constitution; of Jefferson, author of the Declaration of Independence, who announced the great law of equality and human rights; of Marshall, without whose luminous and far-sighted exposition the Constitution could hardly have been put into successful and harmonious operation, are inseparably connected with hers. She first called Washington into the public service in his youth, giving her commission as deputy surveyor, the office of surveyor-general being then held by the corporation of the college. He was for the last twelve years of his life chancellor of William and Mary. Jefferson and Marshall were her graduates. We doubt if any college in America or Europe can, in proportion to the whole number borne on its catalogue, show so large a list of names famous for conspicuous patriotic service, or can extract from its history a passage like this, which is taken from President Ewell's historical sketch of William and Mary:

"Besides her long roll of most eminent divines, lawyers, and physicians in private life, she has given to the country two eminent Attorney-Generals of the United States; to the House of Representatives of the Congress of the United States nearly twenty members; and to the Senate of the United States fifteen Senators; to Virginia and other States, seventeen governors; to the country, one historian and numberless eminent writers; to the State and the United States, thirty-seven judges; to the Revolution, twenty-seven of her sons; to the Army of the United States, a Lieutenant-General and a score of principal and subordinate officers; to the U. S. Navy, a list of paladins of the sea, headed by Warrington and Thomas Ap-Catesby Jones; to the colleges and university, twelve professors; to the nation, three presidents—Jefferson, Monroe, and John Tyler; to independence, four signers of its declaration; to the first American Congress, its President; to the Federal judiciary, its most eminent chief-justice, John Marshall; to the Federal executive, seven cabinet officers; and to the convention which framed the Constitution of the United States, Edmond Randolph, its chief author and draftsman.

"In all, she has given to her country more than two hundred heroes and sages who have been preeminently distinguished in public service and place."

Your committee are of opinion that if the accidents of war had led to the injury of Mount Vernon, of the house or the tomb of Washington, or of Independence Hall in Philadelphia, we should have hastened to repair the injury. We shall more truly honor Washington by restoring the living fountain of learning whose service was the pleasure of his last years, than by any empty act of worship or respect toward his sepulcher.

There is another view of this matter which impresses some of the members of your committee with very great force. It is unquestionable that, by the law of nations, institutions of learning are exempted by all civilized nations from the hostilities of war. They are to be classed, in this respect, with public libraries, monuments, collections of art or science, hospitals, etc. The Government of the United States, in its "Instructions for the Government of Armies in the Field," originally prepared by Dr. Lieber, revised by a board of officers, of which Major-General Hitchcock was president, and approved by President Lincoln in 1863, binds itself by these rules:

Extract from General Order No. 100, Adjutant-General's Office, section 2, paragraphs 34 to 36.

"34. As a general rule, the property belonging to churches, to hospitals, or other establishments of an exclusively charitable character, to establishments of education or foundations for the promotion of knowledge, whether public schools, universities, academies of learning, or observatories, museums of the fine arts, or of a scientific character, such property is not to be considered public property in the sense of paragraph 31; but it may be taxed or used when the public service may require it.

"35. Classical works of art, libraries, scientific collections, or precious instruments, such as astronomical telescopes, as well as hospitals, must be secured against all avoidable injury, even when they are contained in fortified places while besieged or bombarded.

"36. If such works of art, libraries, collections, or instruments belonging to a hostile nation or government can be removed without injury, the ruler of the conquering state or nation may order them to be seized and removed for the benefit of the said nation. The ultimate ownership is to be settled by the enduring treaty of peace. In no case shall they be sold or given away, if captured by the armies of the United States; nor shall they ever be privately appropriated or wantonly destroyed or injured."

It is needless to multiply citations. Every authority on the law of nations who touches the subject, from Grotius to Halleck, agrees that the destruction of property of this class is a violation of this law. But it can not be maintained that the government is liable for all injuries committed either by its authority, or wantonly by its troops, without orders, upon property protected by this rule. But there are many examples in history which seem to place the case of endowed institutions of learning, established by funds given for public purposes, upon grounds of their own, and give them a peculiar title to reparation when so injured, which is not possessed by the public school, or even by the church. The funds or buildings of the public school are public funds belonging to the hostile sovereign and appropriated to the fulfillment of a function which that sovereign undertakes to perform for the citizen. The funds or buildings of the church, though consecrated to the highest objects, are the property of particular sects, and are neither within the control or for the use of mankind at large. But, in the language of an eminent judge, "the arts and sciences are admitted among all civilized nations as forming an exception to the severe rights of warfare, and as entitled to favor and protection. They are considered, not as the peculium of this or that nation, but as the property of mankind at large, and as belonging to the common interest of the whole species." (Case of the Marquis de Somerueles, Stewart's Rep., Nova Scotia, p. 482.)

The endowed corporation of the college can do nothing except hold and apply its fund to a cause which is for the benefit of mankind at large. It can not commit an act of war, and the hostile character can not properly be imputed to it. While a violation of the law of nations in the conduct of the war for the suppression of the rebellion can not constitute a claim upon the Government of the United States, using the term "claim" in the sense of legal constraint, we believe this Government should, in dealing with an American college, imitate the frequent examples which history furnishes, where the most highly civilized nations and the most famous commanders have respected their moral obligations by making voluntary reparation at their own expense of injuries inflicted on endowed colleges and kindred institutions by the operations of war.

During the battle of Princeton the Americans, in dislodging the British from the college-building, fired a cannon-shot through the walls; Washington, in order to make good to the college the damage sustained by the fire of his troops, made the trustees a present of fifty guineas.

During the war of independence the buildings of William and Mary were repeatedly occupied by British troops. They were in every instance respected as sacred to the cause of letters and left intact. After the close of the war Louis XVI, the ally of America, caused the buildings, accidentally destroyed by the fire of his troops, to be replaced and every injury to be repaired.

Thus it appears that a Virginian, the chancellor of the College of William and Mary, rendered to a Northern college the justice which is now asked for her. Thus it appears that a foreign monarch rendered, under like circumstances, to William and Mary herself the justice which she now asks of her countryman of the Republic.

The British troops, under Tryon, when they occupied Yale College in 1779, spared Yale College, although its students in arms harassed their approach. But President Clup's manuscripts were carried off. President Stiles addressed a letter to General Tryon, in which he represented that "a war against science had been reprobated for ages by the wisest and most powerful generals. The irreparable losses sustained by the Alexandrian library and other ancient monuments of literature have prompted the victorious commanders of modern ages to exempt these monuments from the ravages and desolations inseparable to the highest rigors of war."

General Tryon replied, that, "disposed by principle as well as inclination to prevent the violence of war from injuring the rights of the republic of learning, he very much approved of the president's solicitude for the recovery of the manuscripts," and caused every effort to be made for their recovery and restoration.

In the war with Great Britain of 1812, a quantity of paintings and prints, designed for the Academy of Arts at Philadelphia, were captured by the British on their passage from Italy, and taken into Halifax. Dr. Croke, the distinguished judge of the admiralty court, without hesitation, ordered them to be restored, saying, in addition to the passage already quoted, "Heaven forbid that such an application to the generosity of Great Britain should ever be ineffectual." Case of the Marquis de Somerueles, above cited.

We believe that to follow the example of Washington, of Louis XVI, of Judge Croke, of Tryon, will make every college in America safer, if civil strife or foreign war should ever hereafter disturb our peace. Every new State, as it takes its place in the great family, makes haste to establish its university. Their pupils, scattered over the country, retain their attachment for them and for each other, which is one of the strongest bonds of the Union. In her bloodiest and angriest civil strifes, England has respected her great schools and colleges. The cause of William and Mary is, in this respect, the cause of every college in the country.

No gentleman need fear that a vote for this bill will furnish a dangerous precedent for large claims against the Treasury, or will expose him to public reproach. No other institution in the country can present a case standing upon like principles with that of William and Mary. A careful inquiry has failed to develop evidence of injuries sustained in the late rebellion by endowed institutions of learning exceeding in all the amount of $100,000.

A bill like the present passed the House in the Forty-second Congress, but was not reached in the Senate for want of time. It was received with expressions of approbation by the press of all parties, and by persons connected with the colleges throughout the country. The committee report the accompanying bill.

APPENDIX B.

[Senate Mis. Doc. No. 19, Fifty-third Congress, first session.]

MEMORIAL OF THE WASHINGTON COLLEGE (NOW WASHINGTON AND LEE UNIVERSITY) FOR COMPENSATION FOR INJURY TO PROPERTY DURING THE LATE WAR.

To the Senate and House of Representatives in Congress assembled:

The memorial of Washington College (now known as Washington and Lee University), located at Lexington, Va., respectfully represents:

That the institution had its origin in a classical school taught in the Valley of Virginia as early as the year 1749. The school was erected into an academy known as Augusta Academy, governed by a board of trustees. On the 13th of May, 1776, nearly two months before the Declaration of Independence, the board of trustees, in response to the patriotic sentiment of the times, changed the name to Liberty Hall Academy.

When Tarleton and his troopers dispersed the Virginia legislature at Charlottesville, and threatened to invade the valley of Virginia, the men of the valley, many of whom had seen service, rapidly organized into companies and marched to Rockfish Gap to check his advance. Among them was a company composed chiefly of students of the academy, commanded by its rector, William Graham. Tarleton, finding the mountain so strongly defended by the riflemen of the valley, abandoned his purpose and retraced his steps.

The institution was removed successively to different places and was finally located at Lexington, which was founded in 1778 as the county seat of Rockbridge County, and called after Lexington, Mass., where the first guns of the Revolution were fired.

In 1784 the legislature of Virginia, desiring to embrace every suitable occasion of testifying their sense of the unexampled merits of Gen. George Washington for his services in securing the liberties of the country, directed the treasurer of the State to subscribe to 100 shares, of the par value of $200, in the stock of the James River Company, a company chartered for the improvement of the navigation of James River, and vested the same in Gen. Washington. But Washington declined to accept the same for private emolument, but agreed to accept it upon the condition that he could turn the destination to objects of a public nature, to which condition the legislature acceded. In 1796, when the stock seemed about to become productive, Gen. Washington bestowed it on Liberty Hall Academy.

In his letter to the trustees of the academy, in answer to their address acknowledging the donation, he said:

"To promote literature in the rising empire and to encourage the arts have ever been amongst the warmest wishes of my heart; and if the donation which the generosity of the legislature of the Commonwealth of Virginia has enabled me to bestow on Liberty Hall—now by your politeness called Washington Academy—is likely to prove a mean to accomplishing these ends, it will contribute to the gratification of my desires. Sentiments like those which have flowed from your pen excite my gratitude, whilst I offer my best vows for the prosperity of the academy and for the honor and happiness of those under whose auspices it is conducted."

These shares were afterwards retired, and by solemn compact on the part of the legislature of Virginia, in consideration of retiring this stock of the old James River Company, the treasury of the Commonwealth is to pay Washington College 6 per cent interest on the sum of $50,000 annually forever; which obligation has been religiously observed by the Commonwealth.

In 1802 the Cincinnati Society of Virginia, composed of surviving officers of the Revolution, decided to dissolve the association and assign their funds to some benevolent object. They declared—

"That the object of the appropriation of the funds of the society be the seminary of learning in the county of Rockbridge, denominated Washington Academy (to which the shares of the James River Company heretofore vested in our late illustrious leader and hero, General Washington, have by him been appropriated), subject to such charges of a charitable nature as have been or may be adopted by this society."

From this endowment about $25,000 was realized.

John Robinson, a native of Ireland and a soldier under Washington, filled with love and veneration for his virtues and a laudable zeal to further promote the noble purpose of the "Father of his Country," in 1826 bequeathed to Washington College (as it was then known) his whole estate, amounting to $46,500. By prudent management the college, when the late war broke out, had secured ample buildings, apparatus, and libraries, and an endowment fund of nearly $100,000, chiefly contributed by the patriots of the Revolution. Although the annual attendance of students never reached 100, its alumni have adorned the bench, the bar, the pulpit, the medical profession, the halls of legislation, the seats of learning, and all the walks of life. Two of these alumni became justices of the Supreme Court of the United States, 2 Attorneys-General of the United States, 9 governors of States, 13 U. S. Senators, nearly 30 Representatives in the U. S. Congress, 3 foreign ministers, 15 judges of the State appellate courts, 18 presidents of colleges and universities, and a large number members of State legislatures, State officers, judges of inferior courts, professors in colleges and universities, and prominent and useful members of society.

When the Federal forces under Gen. David Hunter entered the town of Lexington on June 11, 1864, the college was open and the professors and students engaged in the peaceful pursuits of learning. The Federal forces occupied the grounds and buildings, a battery of artillery was parked on the campus, the horses occupied the dormitories, and Gen. Crook had his headquarters on the college grounds. During an occupancy of three days the buildings were dismantled, the apparatus destroyed, and the libraries mutilated by the soldiers, and all without authority. In June, 1865, immediately after the close of hostilities, a committee of the board of trustees, in connection with a committee of the faculty, and accompanied by Lieut. Col. T. McLeister, commanding the post, made a careful estimate of the damage, which they ascertained amounted to $17,484. Copies of their reports, of the certificate of Lieut. Col. McLeister, and affidavits in support of the reports are herewith appended. The originals are among the records of the board of trustees of the university and will be produced if necessary.

Your memorialist further represents that the said college was not at the time, or at any other time, in the use, occupation, or under the control of the government of Virginia or of the Confederate States, or of the military power or soldiers of either, or in any respect whatsoever obnoxious to the authorities or armies of the United States; that it was in use as a private educational institution only, with its regular curriculum in the arts and sciences. That it was strictly and only a private corporation not in connection with and not controlled now or at any time heretofore by the State or any political government.

Your memorialist would further represent that since the return of peace the institution has been revived, such buildings, apparatus, and appliances of instructions as its limited means would permit were supplied, its course of instruction extended, the number of students largely increased, and large additions made to the endowment.

In this direction, as well as in the further development of the institution, we have been greatly, though inadequately, aided in view of the enlarged purposes contem-

plated by Washington in the bestowment of his bounty and by other benefactors, by handsome contributions from Cyrus H. McCormick, of Chicago; Warren Newcomb, Mrs. Josephine Louise Newcomb, and F. O. French, of New York; W. W. Corcoran, of Washington City; Col. Thomas A. Scott, H. H .Hinston, Dr. Vincent L. Bradford, and Rathmell Wilson, of Philadelphia; Lewis Brooks, of Rochester, N. Y.; R. H. Bayly and Dr. W. N. Mercer, of New Orleans; Mrs. Evelina H. Birely and Mrs. Caroline Donovan, of Baltimore; Mrs. Mary B. Ross, of Virginia, and George Peabody, of London, showing the kind feeling entertained for the institution by all parts of the country. Five of the alumni of this period are now members of the present House of Representatives.

Your memorialist prays that your honorable body will reimburse the institution for the loss thus sustained. Congress has passed several bills which are precedents for such action, notably the bill passed at the last session reimbursing William and Mary College, which is almost identical with this claim. And in duty bound your memorialist will ever pray, etc.

WILLIAM M. LAUGHLIN,
Rector.

Extracts from the minutes of the board of trustees of Washington College, Virginia, in called session, June 21, 1865.

Resolved, That a committee of three be appointed, who shall, as soon as practicable, take and reduce to writing evidence showing the extent and value of the damage done to the college buildings, libraries, apparatus, and inclosures by the United States forces under the command of Maj. Gen. Hunter, in the month of June. 1864; that, if practicable, said committee shall procure the assistance of some officer of the U. S. Army in taking said testimony, and that they make a full report at the adjourned meeting of this board; whereupon J. D. Davidson, John W. Brockenbrough, and J. McD. Alexander were appointed the committee.

BOARD OF TRUSTEES OF WASHINGTON COLLEGE, IN ADJOURNED SESSION,
August 3, 1865.

The committee on damages to the buildings, etc., of college, committed by the United States forces under the command of Gen. Hunter in June, 1864, submitted a report, which was received and adopted, and the committee continued with instructions to memorialize Congress for reimbursement.

"*To the Board of Trustees of Washington College:*

"In obedience to an order made at your special meeting in June, 1865, the undersigned committee report that they carefully examined the college buildings in July. 1865, in company with Col. T. McLeister, then commanding the post at Lexi ngton The estimate made by the college faculty of the damage done to its buildings and their contents by Gen. Hunter's army in June, 1864, is herewith returned as a part of this report, and is regarded as a low estimate.

"The statement of Col. McLeister, who patiently examined the buildings with your committee, is also herewith returned as a part of this report. The committee will only add that Lieut. Hoover, one of Col. McLeister's officers, was present during this examination, and informed this committee that he was with Gen. Hunter's army in Lexington in June, 1864, and witnessed the destruction by his soldiers of the college property. He was willing to furnish his certificate to that effect, but the colonel and his staff having been relieved by an unexpected order, Lieut. Hoover left the post before your committee were aware of the order, and they, therefore, failed to procure his certificate. He was attached to a Pennsylvania regiment of volunteers, commanded by Col. McLeister.

"We simply report these facts and figures that they may be preserved amongst the records of Washington College.

"Respectfully submitted by

"J. D. DAVIDSON,
"JOHN W. BROCKENBROUGH,
"*Committee.*"

HEADQUARTERS UNITED STATES FORCES,
Lexington, Va., July 21, 1865.

Having been requested by John H. Brockenbrough, J. D. Davidson, and John Alexander, citizens of Lexington, Va., a committee appointed by the trustees of Washington College, in said town, to examine the injury done to the buildings and contents of said college, in the month of June, 1864, when Gen. Hunter's army

passed through this place, to be with them in said examination, I hereby certify that I was present with them on the 17th instant and went with them through the buildings. The damage done the buildings, libraries, apparatus, etc., is great and presents the appearance very much of a sacked house. Whether done by the troops of Gen. Hunter or not, or whether the items of property, etc., mentioned in the annexed report of the college faculty, were actually destroyed by the said soldiers, I am not able to say; nor am I familiar with the prices fixed on said items.

I can only say that the examination made in my presence was full and thorough, and the destruction of property is apparent, and that the herein report presents a true statement of the extent of the damages done.

Respectfully, yours,

T. McLEISTER,
Lieutenant-Colonel, Commanding Post.

Estimate of damage done to Washington College by Gen. Hunter's army during their occupation of Lexington, Va., in June, 1864.

Destruction of books in college library	$2,800
Destruction of philosophical, chemical, and mathematical apparatus	5,000
Destruction of chemicals, etc	350
Destruction of cabinet of minerals, etc	1,400
Damages done to buildings	1,200
Loss of books in library of Graham Society	3,500
Loss of furniture in hall of Graham Society	574
Loss of books belonging to Washington Society	2,100
Loss of furniture in hall of Washington Society	560
	17,484

The loss to the college library is upward of one thousand volumes. Of the books left at least one-half the sets are broken. All maps and charts, of which there was a good collection, were destroyed. Of the library belonging to the Graham Society some two thousand volumes are missing, and half as many belonging to the Washington Society. The philosophical, chemical, and mathematical apparatus were entirely destroyed, as also the very large and well-arranged cabinet of minerals. The damage done to buildings consists chiefly in the breaking of nearly all the glass, sash, locks, and cases in all the buildings; destruction of doors, fences, etc.

The above estimate was made by the faculty of the college.

C. J. HARRIS,
Clerk of Faculty.

STATE OF VIRGINIA, *County of Rockbridge, to wit:*

Carter J. Harris, Alexander L. Nelson, and John L. Campbell this day personally appeared before me, a justice of the peace for the county and State aforesaid, and made oath in solemn form of law that in the year 1865 they, as a committee of the faculty of the Washington College, Virginia, estimated the damages done to the property of said college during the occupation of the town of Lexington, Va., by the United States forces under the command of Maj. Gen. Hunter, in the month of June, 1864, and ascertained the same to amount to the sum of $17,484. The items of said damage are set forth in the report to the faculty, signed "C. J. Harris, clerk of faculty," to the board of trustees, and affiants believe the said estimates to be fair and reasonable.

C. J. HARRIS,
A. L. NELSON,
J. L. CAMPBELL.

Sworn to and subscribed before me this 19th day of February, 1872.

C. M. DOLD, *J. P.*

At the request of a committee of the board of trustees of Washington College, Virginia, I make the following statement in relation to the damage done to Washington College and its property by the United States troops in June, 1864.

I am a citizen of Lexington, in which the college is located, and have been for upwards of forty years. I am also a trustee of the college and have been for upwards of twenty years. I was at home at the time Gen. Hunter's army took possession of the town, and remained in possession for several days. Shortly after they took possession I, who lived in the upper end of the town, was informed by my

brother, Samuel McD. Moore, who lived in the lower end, and near where Gen. Hunter had his quarters, that the troops were preparing to burn the college and had collected combustibles for the purpose, and that something ought to be done to prevent it. I hastened to the quarters of Gen. Hunter, and in passing close by the buildings I saw several hundred soldiers in and around the buildings. I did not enter myself, but the laboratory was crowded, and there appeared to be others in all the houses. I distinctly heard the crashing of the glassware in the laboratory, and from what I heard and saw I inferred that the apparatus was entirely destroyed and demolished, and this was confirmed by what I saw afterwards.

As soon as I got to the general's quarters, at the door, I met several officers, to one of whom I made known my business, and who I took to be one of the staff. He promptly ordered a guard to protect the college, and I do not believe further injury was done, at least to the buildings. Having been educated in the college, and a member for a long time of one of the literary societies, I often visited their libraries. They had been accumulating for upwards of half a century. The selections were well made and the books were well taken care of. I do not know what was the number of volumes. These libraries were greatly injured, the books taken away and scattered in every direction. The college library I do not recollect much about. At the time I passed the college to Gen. Hunter's quarters, I am under the impression there were officers present who did nothing that I saw to restrain the soldiers. I recollect of one officer on horseback riding up and in bitter terms condemning and denouncing the whole proceeding, but seemed to have no power to stop it.

DAVID E. MOORE, SR.

STATE OF VIRGINIA, *Rockbridge County, to wit:*

This day personally appeared before me, a justice of the peace for Rockbridge County, David E. Moore, and made oath that the foregoing statement of facts in reference to the injury to Washington College is true.

Witness my hand and seal this 19th day of February, 1872.

J. D. H. ROSS, *J. P.*

STATE OF VIRGINIA, *County of Rockbridge, to wit:*

Mrs. C. K. Harris this day personally appeared before the undersigned, a justice of the peace for the county and State aforesaid, and made oath in solemn form that she is the wife of Prof. C. J. Harris, of Washington College, located at Lexington, Va.; that her residence is on the grounds of said college immediately adjacent to the buildings used for dormitories, lecture rooms, libraries, society halls, etc.; that she was at home in June, 1864, during the occupation of the town of Lexington by the United States forces under the command of Maj. Gen. Hunter; that a portion of said forces encamped within the college inclosures and used the dormitories for the accommodation of their horses; that after their departure she saw articles of furniture strewn around the college buildings, windows smashed and a general injury to the buildings; that she saw books from the libraries scattered around the buildings, and large numbers of them in a field in rear of the college buildings. Affiant further says that she met one of the number, who remarked to her that "It is a shame to treat an institution of learning in such a manner."

C. K. HARRIS.

Sworn to and subscribed before me this 16th day of February, 1872.

C. M. DOLD, *J. P.*

STATE OF VIRGINIA, *County of Rockbridge, to wit:*

This day Dr. John H. Freeman personally appeared before me, a notary public for the county and State aforesaid, and made oath that he resided in Lexington, Va., when the town was occupied by the Federal Army under the command of Gen. David Hunter; that he saw the Federal troops in the occupation of the grounds belonging to Washington College, and that he knows that Gen. Crook's command, or a part of it, were encamped on the college grounds. Affiant saw that great damage was done to the building, apparatus, and libraries of said college, but he does not know the value of such damage.

J. H. FREEMAN, M. D.

Sworn to and subscribed by J. H. Freeman before me this the 27th day of March, 1893.

Given under my hand and official seal at Lexington, Va., this the 27th day of March, 1893.

[NOTARIAL SEAL.]

W. T. SHIELDS,
Notary Public.

I, John L. Campbell, secretary of the board of trustees of Washington and Lee University, do certify that the foregoing extracts from the record of the board of trustees are true extracts from the records of said board in my possession; and that the foregoing copies of the report of the committee of the board of trustees, the certificate of Col. McLeister, of the estimate of damages signed "C. J. Harris," clerk, and of the affidavits, are true copies of the originals which are on file in my office.

JNO. L. CAMPBELL,
Secretary Board of Trustees, Washington and Lee University.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 433.

IN THE SENATE OF THE UNITED STATES.

MAY 24, 1894.—Ordered to be printed.

Mr. HUNTON, from the Committee to Establish the University of the United States, submitted the following

REPORT:

[To accompany S. 1708.]

The Select Committee to Establish the University of the United States, to whom was referred the bill (S. 1708) "to establish a national university," having considered the same, report as follows:

The need of such an institution as the bill contemplates seems to your committee beyond question, since, in the language of its author and in the purpose of the multitude of its learned supporters, the University of the United States is to be, not an institution of the same type as even the greatest of existing universities, either American or foreign—

But rather an institution broader in its scope, more complete in its organization, more philosophic and practical in its internal regulations, with the highest possible educational standards and aims; an institution above and beyond the best of the colleges, with their loosely attached professional schools, and on its own higher plane existing for the extension and diffusion of all branches of useful knowledge; an institution where the love of knowledge * * * shall be fostered and developed; where advanced students, devoted to any branch of knowledge, whether science, language, literature, or philosophy, or to any of the combinations of these constituting the numerous professional courses of instruction, shall intermingle and enjoy friendly intercourse as peers of the same realm; where the professors, chosen from among the ablest and best scholars of the world, with absolute freedom of conscience and of speech, shall be not teachers of the known merely, but also earnest searchers after the unknown and capable, by their genius, enthusiasm, and moral power, of infusing their own lofty ambition into the minds of all who wait upon their instruction; a university not barely complying with the demands of the age, but one that shall create, develop, and satisfy new demands and aspirations, that shall have power to fashion and mold the age unto its own ideal, and which through every change and every real advance of the world shall still be at the front, driving back from their fastnesses the powers of darkness, opening up new continents of truth to the grand army of progress, so leading the nation forward and helping to elevate the whole human race.

In the opinion of your committee such an institution should be deemed necessary, first of all, on account of the supreme work it would do in every division of the purely educational field—work at present but very partially and scatteringly done at those few institutions so fortunate as to have a concurrence of competent men with the means requisite to the support of systematic courses of postgraduate instruction.

(2) It would powerfully contribute to the improvement of the whole series of schools of the country, from the kindergarten to the university.

(3) It would correlate, broaden, elevate, and strengthen the entire circle of the so-called professions, not only furnishing, but indirectly elsewhere compelling better preparation for professional studies, with higher standards of professional attainment, and hence broader and more thorough courses of instruction.

(4) It would prove a most important means of supplying to a multitude of industrial occupations the scientific principles requisite to their highest success, thus dignifying labor and building up many new professions.

(5) It would enlarge the field of human knowledge by means of the original researches and investigations of its members, while, at the same time, inducting students of genius into the art of investigation, thus helping mankind to an earlier mastery over the hidden forces of nature.

(6) Such an institution would prove a powerful defender, as well as discoverer and teacher of truth.

> Among its members there would always be moral heroes as superior to the menaces of power as to the insidious arts of the most skillful and corrupt devotees of false gods—men able to unmask error and bold to stand for the right at all hazards. The sacredness of truth, freedom of thought, and freedom of speech will be the inscription upon its portals. It will be not a light-house only, but a bulwark of liberty and a watchtower for the nation and the world.

(7) The proposed university is also a patriotic necessity. It would secure to us as a great people the independence we need in things intellectual. It would strengthen our love of country, and so prove a new and powerful safeguard of free institutions. It would gather to its seat not only persons of genius and of lofty aspirations from all portions of the Union, but from all parts of the civilized world, thus at once stopping the present exodus to foreign institutions for advantages we do not here furnish and turning the tide of superior learning to our own shores. It would help the United States to a commanding influence as a beneficent power among the nations; to a practical leadership in the march of civilization.

For these important reasons the establishment of such an institution as the one now proposed has been in the minds of the foremost scholars and statesmen of our country from a period anterior to the adoption of the American Constitution.

We find that Gen. George Washington considered the subject and predicted the establishment of a national university when in his military camp at Cambridge in 1775; that James Madison, John Adams, Charles C. Pickering, Benjamin Franklin, William Samuel Johnson, James Rutledge, and others, realizing its importance and being unwilling to trust to the chances of future legislation, strongly favored provision for it in the Constitution itself; that upon the failure of this proposition in the convention,[1] solely because a majority deemed it an unnecessary encumbrance of that instrument, Dr. Benjamin Rush, signer of the Declaration of Independence and the leading American scientist of his time, eloquently pressed the subject upon the country in an address to the people of the United States, saying:

> Let one of the first acts of the new Congress be to establish within the district to be allotted them a Federal university, into which the youth of the United States shall be received after they have finished their studies and taken their degrees in their respective States. * * *

[1] Madison Papers, II, 740; III, 1354, 1577.

Let it not be said, this is not the time for such a literary and political establishment. Let us first restore our public credit. * * * Let us regulate our militia, let us build our navy, and let us protect and extend our commerce. * * * This is false reasoning. We shall never restore public credit, regulate our militia, build a navy, and revive our commerce until we remove the ignorance and prejudices and change the habits of our citizens.

It was in this great interest that Thomas Jefferson, afterwards its supporter as President, while yet Vice-President (in 1795) even went so far as to propose the importation of a learned faculty from Geneva, as a means of beginning the work of such a university.

It was because of his continued and ever-deepening interest in the early founding of the institution that President Washington, having consulted with James Madison and Edmund Randolph, announced to the Commissioners of this District, in 1795, his purpose to contribute a considerable sum, in stocks of the Potomac Company, toward the founding of a university peculiarly American in character, saying:

For this reason I have greatly wished to see a plan adopted by which the arts, sciences, and belles-lettres could be taught in their fullest extent, thereby embracing all the advantages of European tuition with the means of acquiring the liberal knowledge which is necessary to qualify our citizens for the exigencies of public as well as private life, and (which with me is a consideration of great magnitude) by assembling the youth from the different parts of this rising Republic, contributing from their intercourse an interchange of information to the removal of prejudices which might sometimes arise from local circumstances.

It is known that he actually did contribute a sum which, had the purposes of the giver been carried out, would now have amounted to over four millions of dollars; that in the preparation of his farewell address, in 1796, he set apart the 19 acres of land long known as "University Square" as a site for that institution; and that in his final message to Congress he said, among other things, on this head:

I have heretofore proposed to the consideration of Congress the expediency of establishing a national university and also a military academy. The desirableness of both these institutions has so constantly increased with every new view I have taken on the subject that I can not omit the opportunity of once for all recalling your attention to them. The assembly to which I address myself is too enlightened not to be fully sensible how much a flourishing state of the arts and sciences contributes to material prosperity and reputation. True it is that our country, much to its honor, contains many seminaries of learning, highly respectable and useful, but the funds upon which they rest are too narrow to command the ablest professors in the different departments of liberal knowledge for the institution contemplated, though they would be excellent auxiliaries. Among the motives to such an institution, the assimilation of the principles, opinions, and manners of our countrymen by the common education of a portion of our youth from every quarter will deserve attention. The more homogeneous our people can be made in these particulars the greater will be our prospect of permanent union; and the primary object of such a national institution should be the education of our youth in the science of government. In a republic what species of knowledge can be equally important, and what duty more pressing on its legislature, than to patronize a plan for communicating it to those who are to be the guardians of the future liberties of the country?

We also find that, immediately after this last appeal of Washington, the commissioners appointed under the act to establish the temporary and permanent seat of the Government of the United States presented to Congress a memorial in this same behalf, urging the importance of the project, and especially saying:

We flatter ourselves it is only necessary to bring this subject within the view of the Federal Legislature. We think you will eagerly seize the occasion to extend to it your patronage, to give birth to an institution which may perpetuate and endear your names to the latest posterity.

It is also a matter of history that Presidents John Adams and Thomas Jefferson favored the university proposition throughout their terms of office, repeatedly urging its importance upon Congress.

For example, in his sixth annual message, President Jefferson, having already predicted favorable action by Congress and discussed the use of the Treasury surplus for a national endowment, said:

> Education is here placed among the articles of public care; not that it would be proposed to take its ordinary branches out of the hands of private enterprise, which manages so much better all the concerns to which it is equal, but a public institution can alone supply those sciences which, though rarely called for, are necessary to complete the circle, all the parts of which contribute to the improvement of the country, and some to its preservation. * * * The present consideration of a national establishment for education particularly is rendered proper by this circumstance also, that if Congress, approving the proposition, shall yet think it more eligible to found it on a donation of lands, they have it now in their power to endow it with those which will be among the earliest to produce the necessary income.

The utterances of President Madison are so emphatic and important that we quote briefly from a number of them.

From his second message these words:

> By enlightening the opinions, by expanding the patriotism, and by assimilating the principles, the interests, and the manners of those who might resort to this temple of science to be redistributed in due time through every portion of the community, sources of jealousy and prejudice would be diminished, the features of national character would be multiplied and greater extent given to social harmony. But, above all, a well-constituted seminary in the center of the nation is recommended by the consideration that the additional instruction emanating from it would contribute not less to strengthen the foundations than broaden the structure of our free and happy system of government.

From his seventh message:

> Such an institution claims the patronage of Congress as a monument of that solicitude for the advancement of knowledge without which the blessings of liberty can not be fully enjoyed or long preserved; as a model of instruction in the formation of other seminaries; as a nursery of enlightened preceptors; as a central resort of youth and genius from every part of the country, diffusing on their return examples of those national feelings, those liberal sentiments, and those congenial manners which contribute to cement our Union and strength to the political fabric of which that is the foundation.

In his final message he further said:

> The importance which I have attached to the establishment of a university within this District on a scale and for objects worthy the attention of the American nation, induces me to renew my recommendation of it to the favorable consideration of Congress.

The university proposition also received the support of President James Monroe, whose sympathies with the desires and plans of Washington found expression at many times, and who fondly hoped that Columbian College, which did at different times later receive aid from Congress, would somehow grow into the desired institution. On the 28th of March, 1820, he said:

> The establishment of the institution within the Federal District, in the presence of Congress and of all the Departments of the Government, will secure to those who may be educated in it many important advantages. * * * If it receives hereafter the proper encouragement, it can not fail to be eminently useful to the nation.

The same, and more, may be said of John Quincy Adams, who often urged it, even before he came to the Presidency, and who in his first message referred to it with a touching eloquence in these terms:

> Among the first, perhaps the very first, instruments for the improvement of the condition of men, is knowledge; and to the acquisition of much of the knowledge adapted to the wants, the comforts, and the enjoyments of human life, public institutions and seminaries of learning are useful. So convinced of this was the first of my predessors in this office, now first in the memory as he was first in the hearts of his countrymen, that once and again, in his addresses to the Congresses with which he cooperated in the public service, he earnestly recommended the establish-

ment of seminaries of learning, to prepare for all the emergencies of peace and war, a national university and military academy. With respect to the latter, had he lived to the present day, in turning his eyes to the institution at West Point, he would have enjoyed the gratification of his most earnest wishes; but in surveying the city which has been honored with his name, he would have seen the spot of earth which he had destined and bequeathed to the use and benefit of his country as the site for a university still bare and barren.

Again, it was President Jackson who, in 1832, approved the appropriation of $25,000 to Columbian College on account of the generally acknowledged "utility of a central literary establishment," and of his hope that said institution was to realize the dreams and aspirations of the long line of his illustrious predecessors.

Disheartened, as it would seem, by continued disregard of all these earnest appeals of their predecessors, but four of the more recent Presidents have ventured to urge the subject upon the attention of Congress, although several of them are known to have favored the founding of a central university as the crown and completement of the public educational system of the country. Of such as have done so honorable mention may be made, first, of President Grant, who, in his annual message of 1873, said:

I would suggest to Congress the propriety of promoting the establishment in this District of an institution of learning or university of the highest class by donations of lands. There is no place better suited for such an institution than the national capital. There is no other place in which every citizen is so directly interested.

So fully convinced was he of the importance of such an institution, half believing that had it been founded in the time of Washington for the higher education of influential representatives of all sections the late unhappy conflict might never have come; so impressed was he with the wisdom of appropriating lands as a broad and sure foundation, and finally, so confident of early action by Congress, that he thought chiefly of the concurrence of all friends of the proposition upon Washington as the seat of the institution.

It is well known that similar views were cherished by President Hayes, of whose recommendations that of 1877 is especially worthy of note:

The wisdom of legislation upon the part of Congress in aid of the States for the education of the whole people in those branches of study which are taught in the common schools of the country is no longer a question. The intelligent judgment of the country goes still further, regarding it as also both constitutional and expedient for the General Government to extend to technical and higher education such aid as is deemed essential to the general welfare and to our due prominence among the enlightened and cultivated nations of the world. * * * I shall be glad to give my approval to any appropriate measure which may be enacted by Congress for the purpose of supplementing with national aid the local systems of education in * * * all the States; and having already invited your attention to the needs of the District of Columbia with respect to its public-school system, I here add that I believe it desirable, not so much with reference to the local wants of the District, but to the great and lasting benefit of the whole country, that this system should be crowned with a university in all respects in keeping with the national capital, and thereby realize the cherished hopes of Washington on this subject.

We further note the agitation of the national university question from that time forward, with special activity at intervals, by leading scholars, scientists, and statesmen of every portion of the country; its support by the presidents and professors of nearly, if not every, State university, as well as by those of the denominational schools and universities of every section, and even by the heads of the great and new universities founded upon those munificent bequests of distinguished private citizens which have gained for them the admiration and gratitude of all friends of education throughout the world; also the earnest

and systematic support of the proposition by duly-authorized committees of various national, educational, scientific, and patriotic organizations; and, finally, its cordial approval by that great body of eminent men who constitute the managing and working force of scholars and scientists in the many divisions—educational, industrial, and scientific—of the Federal Government, notable examples from the distinguished class last named being found in the successive superintendents of the Coast and Geodetic Survey, of the Naval Observatory, of the Bureaus of Navigation, Hydrography, Medicine and Surgery, Anthropology, Ethnology, and Education; the National Museum, Museum of Hygiene, Government libraries, etc., together with those scientific and other organizations having more or less connection with the Government, which are so honorably represented by the Smithsonian Institution.

As is shown in the memorial of John W. Hoyt, recently published by order of the Senate, and of which liberal use has been made in the preparation of this report, a very considerable number of the army of learned men and officials have at various times advocated the university measure in published papers, public addresses, and official reports—so great a number, indeed, that the proper limits of this report will not justify more than the mention of the fact, unless we venture this final quotation from a very able report of Hon. L. Q. C. Lamar, Secretary of the Interior in 1885, wherein he said:

Eighty years ago President Jefferson, then in the fullest tide of his authority as a party chief, told Congress that to complete the circle of Democratic policy a national university was a necsssity and should be created. In this he followed the recommendations of his predecessors, Washington and Adams, the former of whom, ten years before, declared that the desirableness of a national university had so constantly increased with every new view he had taken of the subject that he could not omit the opportunity of recalling the attention of Congress to its importance. Mr. Madison, in 1810, renewed the recommendation, with the declaration that such an institution would contribute not less to strengthen the foundations than to adorn the structure of our free and happy system of government, and that it would be universal in its beneficial effects.

This national institution which Washington, Adams, Jefferson, and Madison thought so necessary has never been established, and in these later years the idea of a national university constitutes no part of the plans of statesmen and seems to have been lost sight of by the people.

In the meantime scientific bureaus have grown up one by one under the Government, with observatories, laboratories, museums, and libraries, until the whole range of physical science is represented by national institutions established by the Government for the purpose of prosecuting researches, embracing astronomy, meteorology, geography of land and sea, geology, chemistry, statistics, mechanical inventions, etc. If the various commissions, bureaus, and divisions of the Executive Departments at Washington, which have for their object the prosecution of scientific research, could be combined as integral parts of one scientific institution, such institution would be of greater proportions and more comprehensive than any in the world, and should a university be erected thereon, with a superstructure commensurate with the foundation, it would be without a rival in any country.

The common-school system, designed to furnish every citizen with an education which ought to be a strict necessity for his daily work of life, constitutes the foundation for our democracy. But that is not enough to satisfy its instincts. In the history of nations democracies have been the cradles of pure thought and art. The same cause which operates in them exists in American society, and whether through a national university or in fragmentary institutions in the several States, sooner or later a higher education, higher than the common school or the academy or the college can furnish, will alone realize and express the higher aspirations of American democracy.

As final citations of the views of other men upon this important subject, attention is called to the fact that bills similar to the one reported by this committee have been twice before unanimously commended to the national legislature, once by the Committee on Education of the House of Representatives in 1872, and again in 1892 by the Senate's

Select Committee to Establish the University of the United States; the first providing for the payment in perpetuity of 5 per cent interest on a registered certificate of twenty millions; the last mentioned for one-half the net proceeds of the sales of the public lands without limit of time.

The views of the House committee are concisely summed up in the following concluding passage of their unanimous report:

> If, then, it be true, as the committee have briefly endeavored to show, that our country is at present wanting in the facilities essential to the highest culture in many departments of learning; and if it be true that a central university, besides meeting this demand, would quicken, strengthen, and systematize the schools of the country from the lowest to the highest; that it would increase the amount and the love of pure learning, now too little appreciated by our people, and so improve the intellectual status of the nation; that it would tend to homogeneity of sentiment, and thus strengthen the unity and patriotism of the people; that, by gathering at its seat distinguished savants not only of our own but of other lands, it would eventually make of our national capital the intellectual center of the world, and so help the United States of America to rank first and highest among the enlightened nations of the earth, then it is most manifestly the duty of Congress to establish and amply endow such a university at the earliest possible day.
>
> The committee, therefore, affirm their approval of the bill and recommend its passage by the House.

The general conclusion of the Senate committee of the last Congress is set forth in the following concluding passage, no less positive in its terms, to wit:

> Your committee are of the opinion that the cause of American learning demands such an institution as this bill provides for; that the highest dignity and welfare of the nation demand it; that it should be established at the capital of the country, and that, after a delay of one hundred years since it was first proposed and sought to be established by the founders of the Government, it would be unworthy of so great a people to wait longer for a more favorable time in which to meet all these high demands.
>
> The committee therefore approve the bill and recommend its passage.

Should the question arise whether action was had upon these several bills, it remains to be said that each of them was, unfortunately, reported during the last week of the Congress that should have considered it and that time for action was therefore wholly wanting.

And so of the possible question whether, with the efforts of princely givers and of powerful religious denominational bodies aiming at universities, the wants of our people are not likely to be met without the help of the nation, the answer is simple; if we should wholly ignore the insufficiency of their endowments, even the richest of them, and that denominational bias which they can not escape if they would—which, indeed, was and is and will remain the mainspring of their great endeavors—the answer must still, and necessarily, be a most emphatic negative.

No institution, whatever its name or aim, that is local, or that rests on either a private or a denominational foundation; no institution with partial aims, however worthy as viewed from a local or partisan standpoint; no institution with aims less than national and universal, and, on this account, able to command the confidence, active sympathy, and moral, as well as material support of the whole people; no institution not so related to the public-school system of the United States, with its primary, secondary, academic, and university graduations, as to furnish the crown and culmination of the whole series, and so become to them a mighty coordinating and uplifting force; no institution resting on a foundation less broad, ample, and unfailing than that which is

furnished by the geographic empire and boundless resources of the American Union; no institution with less of dignity, or less loftiness of purpose than with absolute impartiality to meet all the intellectual and ethical aims of a great people, and to secure for that people an acknowledged leadership among the nations in all things that make for the progress and highest welfare of the human race; no institution less than equal to all these exalted ends can satisfy the needs and demands of such a people as dwell under the flag of the American Republic.

Progress in higher education has indeed been made in this country since the revival of efforts for the proposed national university; but the growth of science, the needs of the people, and the demands of the age have more than kept pace with the increase of instrumentalities, so that relatively we are no nearer the goal, the realization of the aims so long cherished by the patriots and scholars of the nation, than before.

Indeed, as compared with the leading nations of Europe, we are at a yet greater disadvantage; for the development there has been more marked than here. France, Germany, Austria, and Italy appear to have gained of late a new realization of how incalculably great a factor is the higher education in the struggle of a people for supremacy. Thus Germany, having wisely followed the guidance of her farsighted statesmen, and so become during the last quarter of a century the world's leader in the whole field of higher culture, is now lavishing her resources upon her universities, strengthening them on every side, especially the scientific, and providing new accommodations for them at a cost of millions for a single department.

Austria, not to be outdone in the university role, has in one or two cases not only exceeded Germany, but has placed her central institution before all others in the world, in so far as material provision and ambitious plans are concerned, erecting buildings for its use at a cost exceeding the present available endowment of any university in America, and planning researches in the interest of science which are intended to place her in the van of the world's army of progress.

So of the Dutch, Scandinavian, and English Governments, all have received a new awakening and are moving with a degree of zeal and liberality hitherto unheard of.

Nor are the Latin nations content to rest on laurels already won. France, having advanced the educational budget beyond all precedent, is now revolutionizing and developing her École Pratique des Hautes Études with a view to highest possible standards; is making the École Libre des Sciences Politique the foremost institution of its kind in the world; is devoting over $3,000,000 to new buildings for the Sorbonne, and dealing hardly less liberally with the College de France and with some of the great professional institutions of Paris. Italy is building palatial structures for her universities at the great centers, fully resolved not to be left in the rear of this grand new movement. Everywhere concentration of means and forces, to the end of leadership and eventual supremacy in the university field, is the watchword.

It is for America to say whether she will be content to lag forever in the rear of nations so greatly her inferior in resources, or whether she will at last take the one remaining step requisite to fairly meet the demands of learning and of those free institutions for which she assumes to be the supreme representative.

It would seem, therefore, that it but remains to mature and adopt such a measure as shall in the best manner meet these high demands.

The bill before the Senate, as reported by your committee, provides: That a university of post-graduate rank, with facilities for scientific and literary research and investigation, shall be established in the District of Columbia; that the government of the institution shall be vested in a board of 15 regents, 8 to be appointed by the President, with the advice and consent of the Senate, and 7 to be *ex officio* members, consisting of the President of the United States, the Vice-President, the Chief Justice, the Speaker of the House of Representatives, the Commissioner of Education, the Secretary of the Smithsonian Institution, and the president of the university, and a council of faculties; that the council of faculties shall consist of the president of the university and the deans of faculties, and shall be charged with the planning and direction of instruction and discipline in the several departments and with such other duties as are prescribed in the statutes or designated by the regents; that the immediate government of each faculty shall be intrusted to its own members; that no chair for instruction sectarian in religion or partisan in politics shall be permitted in any form, and no partisan test shall be required or allowed in the appointment of professors or in the selection of any officer of the university; that existing institutions which are free from controlling obligations of a sectarian or partisan nature and have endowments sufficient to support a faculty may become faculties or departments of the university; that the facilities afforded by the university shall be open to all who are competent to use them, on conditions prescribed by the executive committee, with the advice of the faculties directly concerned; that degrees shall be conferred upon such persons only as have previously received the degree of bachelor of arts or some equivalent degree or who have received certificates of graduation from some State educational institution; that each State and Territory, in the ratio of population, shall be entitled to free scholarships of such number—not less than one for each Representative and Delegate in Congress and two for each Senator—as the board of regents shall determine; that for the advancement of science and learning by means of researches and investigations there shall be established fellowships in the university of such character and number as the interests to be represented and the resources at command shall warrant, which fellowships shall yield a partial or a full support, as the regents shall determine; that in the admission and appointment of persons to places or privileges in the university character and competency shall be the sole test of qualifications; that as a means of partially providing building sites for the several departments of the university "University Square," selected and set apart by President George Washington for the use of a national university and heretofore occupied by the National Observatory, shall be set apart for the use and benefit of the University of the United States; that for the practical establishment, support, and maintenance of the university there shall be used one-third of the net proceeds of the sales of the public lands for the period of ten years from the passage of this act; that the regents shall have power to receive and administer all such gifts, devises, and bequests as are made for the benefit of the university; that after the formal opening of the university for instruction the members thereof, under rules approved by the officers, subject to any regulations prescribed by Congress, shall have access to all institutions, collections, and opportunities for study and research under control of the Government so far as the same can be accorded without detriment to the public service, and that, to the end that the largest possible benefit may come of such access, the heads of all bureaus, institutions,

and other organizations of the Government shall be brought into such advisory and cooperative relations with the heads of corresponding departments of the university as the executive committee, with the advice of the heads of faculties and the said officers of the Government, shall agree upon as being advantageous.

Attaching great importance to the many facilities and opportunities for the higher instruction as well as for original research afforded here at the national capital in the form of legislative bodies, the several courts of every class, the nearly 50 scientific bureaus, museums, laboratories, libraries, art collections, hospitals, and other important organizations, and the numerous scientific, literary, and philosophical societies, as well as collegiate institutions, the whole vast array standing for and representing a body of scholarship and scientific attainments without parallel in this country. Realizing also in how important a sense all these are at present but opportunities lost, that the elements of a grand university are in fact already here waiting for an opportunity to marshal themselves in its service, and further realizing how great are the means and forces requisite to secure to the United States their appropriate rank in the educational world, your committee would, under other conditions, have increased rather than diminished the amount of the appropriation for the establishment of the university.

The bill as amended makes as moderate a demand as can be considered. The amount would hardly be felt by the Treasury, and yet it would suffice to launch an institution, the deep and ever-increasing interest in which would insure to it accessions from many sources, with a commanding rank among the great universities of the world ere the lapse of many years. And accordingly, firmly believing that the proposed University of the United States is essential to the completeness and highest efficiency of the American system of educational instrumentalities, and that its early establishment is demanded by the honor of the Republic as a great and rapidly growing and highly responsible power among the nations of the earth, the committee unanimously affirm their approval of the bill, as amended, and recommend its passage by the Senate.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 434.

IN THE SENATE OF THE UNITED STATES.

MAY 25, 1894.—Ordered to be printed.

Mr. ALLEN, from the Committee on Indian Affairs, submitted the following

REPORT:

[To accompany S. 1995.]

The Committee on Indian Affairs, to whom was referred the bill (S. 1995) granting to the Eastern Nebraska and Gulf Railway Company the right of way through the Omaha and Winnebago Indian reservations, having had the same under consideration, beg leave to report as follows:

We recommend the passage of the bill, with the following amendments:

Strike out the word "reservation" in the title of the bill and insert in lieu thereof the word "reservations." Strike out the word "reservation" in line 8, page 1, and insert in lieu thereof the word "reservations." Strike out the word "seventy-five" in line 9, page 1, and insert in lieu thereof the word "fifty." Strike out the word "three" in line 15, page 2, and insert in lieu thereof the word "two." Strike out the word "reservation" in line 17, page 2, and insert in lieu thereof the word "reservations." Add to section 2 of the bill as it now stands the following:

Provided further, That said railway company shall construct and maintain continually all fences, roads and highways, crossings, and necessary bridges over said railway whenever said roads and highways do now or may hereafter cross said railway's right of way or may be by the proper authorities laid out across the same: *Provided further*, That said railway shall be constructed through said reservations within three years after the passage of this act or the rights herein granted shall be forfeited as to that portion of the road not constructed.

Add to bill section 3, in the following manner:

SEC. 3. That Congress may at any time amend, alter or repeal this act, and the right of way hereby granted shall not be assigned or transferred in any form whatever except as to mortgages or other liens that may be given or secured thereon to aid in the construction thereof.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 435.

IN THE SENATE OF THE UNITED STATES.

MAY 25, 1894.—Ordered to be printed.

Mr. MANDERSON, from the Committee on Military Affairs, submitted the following

REPORT:

[To accompany S. 1375.]

The Committee on Military Affairs, to whom was referred the bill (S. 1375) entitled "A bill to remove the charge of desertion from the military record of Jeremiah F. Brown," having had the same under consideration, with the accompanying papers, report it back favorably with amendments and recommend its passage.

Jeremiah F. Brown enlisted in Company F, Fifty-eighth Indiana Volunteer Infantry, and on October 9, 1861, was enrolled to serve three years, as a private, under the name of Franklin Brown, he being commonly known as "Frank" Brown. The records of the War Department report him a deserter from October 3, 1862, and he is so accounted for in the muster-out roll of his company, July 25, 1865.

From the affidavits on file in the War Department, accompanying the application of Brown for the removal of the charge of desertion from his military record, it appears that he served until February, 1862, when, being sick in the camp hospital near Lebanon, Ky., unfit for duty, he was "ordered to be discharged" by the surgeon of the hospital, which discharge was prepared by Capt. Overland of his command, who informed the claimant that he would send to him when it was approved, as the regiment was just starting in the direction of Shiloh. Capt. Overland failed to return the approved discharge, and Brown afterward learned that he died at Nashville, Tenn., about one month later. It further appears that as soon as Brown was able to travel—in October, 1862—he went to his home and remained there until July, 1864, when he enlisted at Hardensburg, Ky., in the State Guards, with which he served until the end of the war.

It is evident to your committee that Brown believed himself to have been duly discharged from the service on account of the disabilities with which he was suffering—bronchitis and general debility—and, inasmuch as he reenlisted in another organization and served to the close of the war, your committee are of the opinion that he should receive the relief desired.

It is proposed to amend the bill so as to make the discharge bear the date of October 3, 1862, the day on which he is reported a deserter; and a further amendment is inserted to make clear the fact that Jeremiah F. Brown and Franklin Brown are the same person.

The bill, as amended, is as follows:

A BILL to remove the charge of desertion from the military record of Jeremiah F. Brown, alias Franklin Brown.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War be, and he is hereby, authorized and directed to remove the charge of desertion standing against the military record of Jeremiah F. Brown, named upon the rolls as Franklin Brown, late of Company F, Fifty-eighth Indiana Infantry, and grant to said Jeremiah F. Brown an honorable discharge, to date October third, eighteen hundred and sixty-two.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 450.

IN THE SENATE OF THE UNITED STATES.

MAY 29, 1894.—Ordered to be printed.

Mr. SHOUP, from the Committee on Indian Affairs, submitted the following

REPORT:

[To accompany S. 1887.]

The Committee on Indian Affairs, to whom was referred the bill (S. 1887) providing for opening the Uncompahgre and Uintah Indian reservations, submit the following report:

This bill provides for making allotments in severalty to the Indians now occupying the Uintah and Uncompahgre reservations in Utah, and for opening to sale and settlement the reservation lands remaining after such allotments are made. The status of these reservations and the reasons for the policy indicated have been thoroughly canvassed in several reports of Congressional committees and of the various officials of the Interior Department, particularly in the report upon H. R. 6557, which is annexed hereto and submitted as a part of this report, and to which reference is made for a statement of the facts and of the considerations which explain the various features of the proposed measure. The bill, S. 1887, is a duplicate of that reported to the House of Representatives and recommended for passage by the Committee on Indian Affairs of that body.

For the reasons stated in the report referred to, your committee is of the opinion that the bill, as amended, be favorably reported and recommend its passage.

Amend section 1 by adding after the word "location," in line 22:

And provided further, That the stipulation contained in the treaty with the Ute Indians, ratified by act of Congress June 15, 1880, whereby the said Indians are obligated to pay for the lands allotted to them in severalty, be, and the same is hereby, waived by the United States, and the allotments provided for by this act shall be made without any price to be paid or charge to be made against any funds to the credit of said Indians.

The reason for recommending this amendment is that an effort to enforce the stipulation of the treaty of 1880 at this date would doubtless cause irritation on the part of the Indians, and might provoke resistance. While under the terms of that treaty a charge of $1.25 per acre might be made against the funds of the Indians for the areas allotted to them, the fact remains that this obligation is very imperfectly, if at all, appreciated by the Indians, and that they have from their long residence upon their present reservation acquired a conviction that the lands belong to them.

In the twelve or fourteen years which have elapsed since the removal of the band from their aboriginal seat in Colorado, a new generation has come into the active management of tribal affairs, and to many of the band the treaty of 1880 is only a tradition, while occupancy of the Utah Reservation is a present fact. It is obviously quite natural, however unreasonable, that the Indians should feel themselves entitled to hold the existing reservation, and should object to making payment for the fraction of that reservation which they will be allowed to retain. Under these circumstances, it is submitted that it is a wiser policy to waive the right of the Government to payment for the lands allotted than to incur the friction, delay, and possible strife which might follow an effort to enforce the letter of the treaty.

Amend section 1, after the word "office," in line 25, by inserting—

Patents for the tracts allotted shall be issued to the several allottees in accordance with the provisions of the act of Congress regulating allotments to Indians in severalty, approved February 8, 1887.

The addition of this provision is recommended on the ground that the bill as it stands is silent as to the issue of patents, and, in the absence of specific authority for such action, there might be doubt as to the legality of giving the allottees proper muniments of title.

Amend section 2, line 3, after the word "the," by striking out the word "homestead" and inserting in lieu thereof the words "general land laws, town site."

The committee are advised that much of the land on this reservation requires irrigation, and the land should, therefore, be open to entry under the desert-land act, including homestead and all other existing land laws.

Amend section 4, line 11, after the word "shall," by inserting "be concurred in by two-thirds of the male members of the tribe over the age of 18 years, and."

This provision seems necessary in order to make certain what vote of the Indians shall be regarded as expressing the will of the tribe.

[House Report No. 660, Fifty-third Congress, second session.]

The Committee on Indian Affairs, having had under consideration House bill 4511, do hereby report the accompanying bill as a substitute therefor, and recommend that it be passed.

The substitute bill provides for the appointment of a commission of three persons to allot lands in severalty to the Uncompahgre Indians within their reservation in the Territory of Utah in accordance with the treaty made with said Indians in 1880, and make subject to entry the lands not needed for such allotments. The bill also authorizes the same commission to treat with the Indians upon the Uintah Indian Reservation in Utah for the cession to the United States of such lands within said reservation not needed for allotments to the Indians.

The Uncompahgre Reservation embraces an area of 1,933,440 acres, or 3,021 square miles of land, and is occupied by 1,021 Indians, or 1,893 acres to each Indian. Of these Indians 513 are males and 508 females, according to the census of 1890.

The Uintah Reservation, which is contiguous to the Uncompahgre, contains an area of 2,039,000 acres, or 3,186 square miles, occupied by 435 Uintah Indians and 398 White River Utes, a total of 833 Indians, being 2,450 acres to each Indian.

It has been estimated by the surveyor-general of Utah that 60 per cent of the lands within each of these two reservations is suitable for agriculture and capable of irrigation.

The rights of the Indians upon the Uintah Reservation differ from those of the Indians upon the Uncompahgre Reservation. The Uncompahgre Indians have no title to any of the lands within the reservation, nothing more than the privilege of temporary occupancy. Such is the conclusion arrived at after careful investigation

by the law officers of the Government. The Assistant Attorney-General, Mr. Hall, in his report to the Secretary of the Interior dated October 23, 1893, says:

"As to the Uncompahgre title these Indians, with other bands of Ute Indians, were, by treaty of March 2, 1868, which was proclaimed November 6, 1868, given a portion of the Territory of Colorado for their absolute and unconditional use. These Indians had title to such lands as were thus given them in the State of Colorado, and the metes and bounds of their said reservation are set forth in said treaty of 1868 and the act ratifying the same. Subsequently, on the 6th of March, 1880, said Indians entered into an agreement with the United States whereby they ceded to the United States all their lands in the State of Colorado. This agreement was ratified by Congress on June 15, 1880 (21 Stats., 199), and subsequently, and within the time prescribed in said act of Congress, the agreements and amendments made thereto by the act of Congress were ratified by three-fourths of the male adult Indians. In the agreement of 1880 the following provision is found:

"'The Uncompahgre to remove and settle upon agricultural lands on Grand River, near the mouth of the Gunnison River, in Colorado, if a sufficient quantity of agricultural land shall be found there; if not, then upon such other agricultural lands as may be found in that vicinity and in the Territory of Utah.'

"These Indians were not placed on the lands referred to, 'on the Grand River near the mouth of the Gunnison River in Colorado,' because a sufficient quantity of agricultural lands could not be found for that purpose; hence, they were removed to the Territory of Utah, to the lands which they now occupy.

"The agreement of 1880 provided that the lands to which these Indians were to be removed was to be surveyed and divided among them in severalty, in certain specified quantities, for which purpose a commission was to be appointed by the President. They were removed from Colorado onto their present reservation in 1882. By executive order of January 5, 1882, the lands which they now occupy were 'withheld from sale and set apart as a reservation for the Uncompahgre Utes.'

"The act of Congress, approved June 5, 1880, which ratified the agreement with these Indians, required that the lands ceded to the United States should be disposed of as follows:

"'None of said lands, whether mineral or otherwise, shall be liable to entry and settlement under the homestead law, and when sold the proceeds of said sale shall be first sacredly applied to reimbursing the United States for all sums paid out or set apart under this act by the Government for the benefit of said Indians, and then be applied in payment for the lands, at $1.25 per acre, which may be ceded to them by the United States outside of their reservation in pursuance of this agreement.'

"It will be seen from this provision of the act of 1880 ratifying the agreement, and which was accepted by the Indians, as hereinbefore stated, that the Uncompahgre Indians are to pay the United States for such lands as they may receive as allotments by virtue of said agreement, at the rate of $1.25 per acre; and that the proceeds of the sale of their lands in the State of Colorado are to be held for this purpose, as well as for reimbursing the United States all sums paid out or set apart under the act of 1880. It is clear to my mind that the Uncompahgre Utes have no title to the lands they occupy; that they occupy these lands as a temporary reservation, until such time as the President may require them by virtue of the agreement and the act of 1880 to take their allotments within the limits of said reservation. When the lands are alloted to these Indians, then they will become absolute owners of the same, with such restrictions upon the right to lease and alienate as is set out in the agreement of 1880; but until their allotments are taken and the lands set apart for them in severalty, they have no such title to the lands as would authorize them to lease the same for any purpose."

By their agreement of March 6, 1880, these Indians agreed to accept allotments as provided in the substitute bill reported. This agreement was ratified by the act of Congress dated June 15, 1880 (21 Stat., 199). Under the agreement the Indians were to pay for the lands allotted to them at the rate of $1.25 per acre. The accompanying bill omits this requirement, allowing the Indians to receive the allotment provided for without making such payment. The Assistant Attorney-General further says:

"I do not know of any other treaty obligations of the United States to the Uncompahgre Indians, except the duty of protecting them in their title to lands whenever the lands shall be allotted to them, as provided in the first article of the agreement of March 6, 1880 (21 Stat., 199 supra):

"That the Government of the United States cause the lands so set apart to be properly surveyed, and to be divided among these said Indians in severalty in the proportion hereinbefore mentioned, and to issue patents in fee simple to them respectively therefor so soon as the necessary laws are passed by Congress. The title to be acquired by the Indians shall not be subject to alienation, a lease, or incumbrance, either by voluntary conveyance of the grantee or by the judgment, order, or decree of any court, or subject to taxation of any character, but shall be and remain inalien-

able and not subject to taxation for the period of twenty-five years, and until such time thereafter as the President of the United States may see fit to remove the restrictions, which shall be incorporated in the patents when issued; and any contract made prior to the removal of such restrictions shall be void."

As to the Uintah Indians the Assistant Attorney-General finds that the Indians are the owners of the lands within the reservation, because, under the act of Congress of May 5, 1864 (13 Stat., 64), it was provided that the lands within the Uintah Reservation should be "set apart for the permanent settlement and exclusive occupation of the Indians." In order, therefore, to make available for settlement any portion of the lands within the Uintah Reservation it is first necessary to obtain the consent of the Indians residing thereon. Accordingly, the bill provides that the commissioners appointed shall treat with said Indians for the purpose of obtaining a relinquishment of their title to any land not needed for allotment to Indians.

These two reservations are situated in the northeastern portion of Utah, and together embrace a tract of about 4,000,000 acres, occupied by less than 2,000 Indians, men, women, and children. The Indians, in their present condition, make no use whatever of a very large proportion of these lands, which are rich in resources and capable of sustaining a large population if reclaimed and utilized.

If the consent of the Indians upon the Uintah Reservation can be obtained, by which they will accept allotments of lands in severalty, and the remainder of the lands is sold and the proceeds derived are used for the benefit of the Indians, their condition will be much better than it is at present. These Indians have already made considerable progress toward civilization, and are entirely competent to receive lands in severalty, and are in a condition to reclaim and improve them. If the residue of the lands are settled by whites the Indians will be more directly brought in contact with civilization and be able to make greater progress by the example thus afforded them.

As to the Uncompahgre Indians, as has already been shown, they have agreed to accept lands in severalty as provided in the bill. They are in a condition to adopt this mode of life. The proceeds of the sale of their lands in Colorado now amount to more than $1,700,000. One-half of this amount is held and applied for the benefit of the Uncompahgre Indians. The Assistant Attorney-General in his letter to the Secretary of the Interior of February 16, 1894, says:

"As to the Uncompahgre Indians, I gave it as my opinion that they occupy the lands in Utah upon which they are located as a temporary reservation. They can be required at any time, by Congress or by the President, to take their allotments in said lands. As to these Indians, I can see no reason why their consent should be asked to any disposition Congress may see proper to make of these lands after allowing them allotment as provided in the agreement and act of Congress referred to in my opinion, a copy of which is hereto attached."

The Secretary of the Interior, in his letter of March 22, 1894, addressed to the chairman of this committee, speaking in regard to the Uncompahgre Indians, says:

"The confederated bands of Ute Indians, by agreement ratified by act of June 15, 1880 (21 Stat., 199), sold to the United States their reservation in Colorado and agreed to remove to other lands. It was further provided that the Indians might take allotments upon the lands to which they should remove, as follows:

"'To each head of a family one quarter of a section, with an additional quantity of grazing land not exceeding one quarter of a section.

"'To each single person over eighteen years of age one-eighth of a section, with an additional quantity of grazing land not exceeding one-eighth of a section.

"'To each orphan child under eighteen years of age one-eighth of a section, with an additional quantity of grazing land not exceeding one-eighth of a section; and to each other person under eighteen years of age, now living, or who may be born prior to said allotments, one-eighth of a section, with a like quantity of grazing land.'

"It was also provided that the proceeds of the sale of the lands in Colorado ceded by said agreement should be 'first sacredly applied to reimbursing the United States for all sums paid out or set apart under this act by the Government for the benefit of said Indians, and then to be applied to payment for the lands at $1.25 per acre which may be ceded to them by the United States outside of their reservation, in pursuance of this agreement,' the balance to be deposited in the Treasury for the benefit of said Indians.

"Under this agreement the Indians were removed to their present location, but allotments have not been made. Afterwards, for their protection, the present reservation was designated by Executive order. It is clear that these Indians have no such title in the lands of this reservation as would entitle them to receive pay for such lands as might remain after they had taken their allotments, for which allotments they are required to pay $1.25 per acre."

In respect to the rights of the Uintah Indians the Secretary uses this language:

"With regard to the Uintah Reservation the facts are somewhat different. I concur in the opinion of the Assistant Attorney-General that these Indians have a title

to the land which they occupy which should be acquired by the United States only by negotiations with them for that purpose. A commission might properly be authorized to conduct such negotiations on the part of the Government. There is sufficient agricultural lands in this reservation to provide allotments for all the Indians belonging there, and probably for those of the Uncompahgres who can not be provided for on their own reservation. The fact that it may be found necessary to settle some of the Uncompahgres upon the Uintah Reservation should be taken into consideration when negotiations shall be had as to the latter."

As to the method of disposing of the unallotted lands on these reservations, the Secretary of the Interior uses this language:

"The manner of disposing of the lands remaining after allotments shall have been made can be more satisfactorily determined after the question of allotments has been settled. If negotiations are to be had and money paid to the Indians the price at which the surplus lands are to be disposed of would be affected if not controlled by the amount to be paid to the Indians. It may be thought proper, however, because of the great value of deposits of asphaltum, gilsonite, and other like substances said to abound in these lands, to make a special provision for their sale at a higher price than is usually fixed for mineral land.

"My opinion at present is that the surplus lands which are agricultural in character should be opened to settlement under the homestead laws, with a provision for payment, in addition to the regular fees, of such amount per acre as will reimburse the United States for any money agreed to be paid the Indians, and that such lands as are mineral in character shall be disposed of under the mineral laws with a like additional payment."

It will thus be seen that in the substitute bill reported the committee have taken into consideration, as nearly as could be ascertained, the rights of the Indians upon the two reservations, and have conformed, as nearly as possible, to the suggestions and recommendations of the Secretary of the Interior both as to the method of dealing with the Indians and of disposing of the lands when thrown open to settlement.

It seems quite clear to the committee, from its investigation and the information received upon the subject, that legislation should be enacted without delay looking to the adjustment of the rights of the Indians and their settlement in such way that they may make progress toward civilization, and that the great resources, agricultural and mineral, which are known to exist within these reservations, should be made subject to development.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 458.

IN THE SENATE OF THE UNITED STATES.

MAY 31, 1894.—Ordered to be printed.

Mr. DOLPH, from the Committee on Foreign Relations, submitted the following

REPORT:

[To accompany S. 2024.]

The Committee on Foreign Relations, having had under consideration Senate bill 2024, and having duly considered the same, report the same favorably with an amendment.

The committee adopt the following House report:

[House Report No. 1378, Fifty-second Congress, first session.]

The Committee on Foreign Affairs, to whom was referred House bill 1891, having had the same under consideration, submit the following report:

By joint resolution of Congress approved February 1, 1888, the sum of $50,000, or so much thereof as might prove necessary, was appropriated to pay such expenses as might be incurred by the Government of the United States in accepting the invitation of the British Government to participate in the international exhibition to be held in Melbourne August 1, 1888.

The sum thus appropriated, it was further directed, was to be expended in the discretion of the Secretary of State.

Under the authority of this act the Secretary of State appointed one commissioner and four assistant commissioners to have general charge and supervision of American exhibits, and to properly represent the interests of the American people at the said exposition, fixing their salaries at the rate of $5,000 and expenses for the commissioner and $2,500 for each of the assistant commissioners, the latter amount being for both salary and expenses.

The commissioner so appointed was Frank McCappin, of California; and the assistant commissioners, F. B. Wheeler, of New York; R. L. Miller, of Virginia; Thomas B. Merry, of Oregon; and Alex. Campbell, of Louisiana.

Prior to these appointments, however, the press throughout the country, in writing of the approaching exposition, had announced that the compensation of the assistant commissioners would be $5,000 and expenses.

To ascertain the truth of these statements inquiries were made at the State Department on the request of the gentlemen subsequently appointed, and these were met by the assurance that it was the purpose of the Department to allow each of the assistant commissioners a salary of $2,500 together with $2,500 each for the expenses of the trip and of the sojourn in Australia.

Thereupon Messrs. Wheeler, Miller, Merry, and Campbell, who had been already selected as assistant commissioners, though not yet publicly appointed, signified their willingness to serve and commenced at once their preparations for the journey to Australia.

It was not until they had made all necessary arrangements for a prolonged absence from the country, after they had engaged passage on the steamer sailing to Melbourne, that the State Department publicly announced the appointments, together with the unexpected reduction in compensation to $2,500 to cover both expenses and salary.

Acting under the belief that this sum might prove sufficient for their expenses of travel and living during their nine months' absence in Australia, the assistant commissioners decided not to draw back, but to continue to Melbourne and render there the service the Government required of them.

It was made to appear, however, to the subcommittee before whom one of the assistant commissioners, Mr. Alex. Campbell, appeared that the expenses were far in excess of what had been anticipated; that the commissioners were subjected to large and unexpected expenses in the discharge of their duties, and that the amount asked in this bill would not repay them for the actual and necessary outlays made in properly discharging the duties of their position as commissioners.

Inasmuch as the labors of these assistant commissioners were not only arduous, but of great value to the country as well; that their acceptance of the office was due to a misunderstanding or to misinformation for which they were in nowise responsible; that their actual expenses in the prosecution of this work for the Government were greater than what has been already allowed and what they now ask, and that there yet remains an unexpended balance of $10,770.27 from the appropriation of February 1, 1888, the committee recommends the passage of this bill, wherein an additional compensation of $1,500 is asked for each of these four assistant commissioners.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 459.

IN THE SENATE OF THE UNITED STATES.

JUNE 1, 1894.—Ordered to be printed.

Mr. FRYE, from the Committee on Commerce, submitted the following

REPORT:

[To accompany S. 1852.]

The Committee on Commerce, to whom was referred the bill (S. 1852) to provide an American register for the steamer *S. Oteri*, having duly considered the same, report as follows:

The steamer *S. Oteri* was built in England in 1881, and has a tonnage of 542 tons net register. She has been engaged in the fruit trade between New Orleans and Honduras. She was wrecked in March, 1885, in the Gulf of Mexico, outside of American waters, when a shaft was broken and other injuries sustained, rendering her unseaworthy. She was towed into New Orleans and repaired at an expense of $9,373.85.

The steamship was again wrecked in August, 1887, in the Carribbean Sea, off the coast of Yucatan. Her machinery broke down, her cabins were swept overboard, together with nearly all her rigging, besides very serious damage being done to her hull and engines. She was again towed to New Orleans and docked in the shipyard of O. F. Valette, where she was thoroughly repaired at an aggregate cost of $22,021.75. Since this last wreck general repairs have been made aggregating $23,900.16.

A recent appraisement of the vessel, according to a valuation, under oath, by the president of the board of harbormasters and other officials at the port of New Orleans, is $25,000.

The statute requires that the repairs to a wrecked vessel must equal three fourths of the value of the vessel after having been so repaired, and that this sum must have been expended in American ports to American labor.

The evidence shows an expenditure for repairs in American ports considerably in excess of the required three-fourths of her value, but having been wrecked outside of American waters, a special act of Congress is required to give the vessel an American register. As she is owned by an American citizen and has been substantially rebuilt in the United States, it is believed by your committee that she is justly entitled to this privilege.

A bill granting an American register to this vessel was favorably reported from the House Committee on Merchant Marine and Fisheries in the Fifty-first Congress, but was not acted on for want of time.

Your committee recommend the passage of the bill.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 464.

IN THE SENATE OF THE UNITED STATES.

JUNE 6, 1894.—Ordered to be printed.

Mr. GALLINGER, from the Committee on Pensions, submitted the following

REPORT:

[To accompany S. 2088.]

The Committee on Pensions, to whom was referred the bill (S. 2088) granting a pension to J. M. Swift, have considered the same and report:

The claimant under this bill served for three years in Company A, First Regiment, Maine Volunteer Infantry, and was an exceptionally brave and faithful soldier. The medical records show that he was several times in hospital, at one time being treated for debility and heart disease, and at other times no diagnosis seems to have been made. Notwithstanding the fact that soldier was treated in hospital for heart diseae she did not apply for pension until the year 1890, at which time he was pensioned at the rate of $12 per month for rheumatism and disease of heart, thus showing that he, like many others of our best soldiers, went for twenty-five years without pension, for which he might properly have asked, and which would undoubtedly have been granted on the strength of his hospital record, and the further fact that the disease of heart had undoubtedly been continuous from the date of his army service. When the soldier applied for pension the declaration set forth rheumatism, heart disease, and sunstroke, it being claimed that the latter disability had been contracted at Gettysburg, and had resulted in softening of the brain and incurable insanity. As already suggested, it was easy to establish the claim for rheumatism and heart disease, but so long a time had elapsed between army service and application for pension that it was impossible to satisfactorily establish the claim for sunstroke. Pension was promptly allowed for rheumatism and heart disease, but no allowance was granted for insanity, which disease was shown to exist in an incurable form, the requisite proof to directly connect the insanity with sunstroke not having been satisfactorily established.

March 19, 1890, claimant was examined by Dr. Taylor N. Snow, of Baker City, Oreg., who found him suffering from rheumatism, heart disease, and atonic insanity. He recommended a total rating for the rheumatism and heart disease, but said that he failed to find any well-defined and separate symptoms of sunstroke, which is not to be wondered at when the length of time that had elapsed is taken into consideration.

June 10, 1891, the same physician again examined the claimant, and he recommended "total rating for the disability caused by rheumatism

for that caused by disease of heart, and insanity." He then explains as follows:

> Do not know cause of insanity. The insanity began like the ordinary attacks of melancholia, which merged into mental weakness, reaching the degree of dementia. * * * Soldier is totally unable to perform any kind of manual labor * * * and does now require the regular aid and attention of another person.

Recently soldier was examined by Dr. O. M. Dodson, of Baker City, who certifies as follows:

> BAKER CITY, OREG., *May 12, 1894.*
>
> I hereby certify that I have attended J. M. Swift at different times since 1883 for rheumatism and valvular disease of the heart, and know that his rheumatism is of a chronic nature and valvular disease of heart organic in its nature, and that he is totally disabled from performing manual labor.
>
> O. M. DODSON, M. D.
>
> Subscribed and sworn to before me on this 12th day of May, A. D. 1894.
>
> [SEAL.] JOSEPH MCKAY,
> *County Clerk.*

Your committee are of opinion that, in view of the fact that soldier did not ask for pension from 1865 to 1890, during which time he was doubtless entitled to pension, and for the further reason that his last medical examination shows him to be in such bad physical condition as to require the constant aid and attention of another person, soldier is unquestionably entitled to a higher rate of pension than he is now receiving. Indeed, it is more than probable that if insanity could be eliminated entirely from the record that the rheumatism and organic heart disease, for which the soldier is pensioned, have progressed to such a stage as to warrant a rating nearly, if not quite, as high as is named in the bill.

The committee report a substitute bill for the one referred to the committee and recommend its passage.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 470.

IN THE SENATE OF THE UNITED STATES.

JUNE 8, 1894.—Ordered to be printed.

Mr. BLACKBURN, from the Committee on Appropriations, submitted the following

REPORT:

[To accompany H. R. 6373.]

The Committee on Appropriations, to whom was referred the bill (H. R. 6373) making appropriations for the support of the Army for the fiscal year ending June 30, 1895, and for other purposes, report the same to the Senate with various amendments, and submit herewith a statement showing the amount of the estimates for these purposes for 1895, the amount provided by the bill as passed the House of Representatives, the amount recommended by the committee, and the amount of the Army appropriation bill for 1894.

A statement is also presented showing the amounts of the Army appropriation acts for the fiscal years 1888 to 1894, inclusive.

The committee have been unable to agree to the provision in the House bill limiting the number of assistant surgeons in the Medical Department to 90, in view of the fact that there has been a reduction in the number of commissioned officers in the Medical Department from 222, in 1867, to 192 at the present time, and that the Commanding General of the Army, the Commanding Generals of the several military departments, and the Surgeon-General, all state in positive terms that the present number is not in excess of the legitimate demands of the military service, and have therefore stricken the provision from the bill.

Letters of the Major-General Commanding and the Surgeon-General relating to this subject, and of the Secretary of War, and others, relating to items of amendment recommended by the committee, are submitted as an appendix to this report.

ARMY APPROPRIATIONS, 1895.

Amount of estimates for 1895	$25,332,918.52
Amount of House bill	23,586,924.68
Increase (net) recommended by Senate committee	19,460.00
Amount as reported to the Senate	23,606,384.68
Amount of act for 1894	24,225,639.78
The bill as reported to the Senate is less than estimates	1,726,533.84
The bill as reported to the Senate is less than the appropriation for 1894	619,255.10

The changes in amounts of House bill recommended by the committee are in the following items:

INCREASE.

For removal of Indian prisoners of war from Mount Vernon barracks, Ala., to Fort Sill, Ind. T., and for their support	$15,000.00
For purchase of land for rifle range at Sacketts Harbor, New York	10,000.00
For medical and hospital supplies	15,000.00
For library of the Surgeon-General's Office	3,000.00
For expenses of Signal Service	5,500.00
For constructing and operating a military telegraph line from El Paso, Tex., to New Fort Bliss, Tex	960.00
Total increase	49,460.00

REDUCTION.

For expenses of recruiting and transportation of recruits	20,000.00
For purchase of machine guns	10,000.00
Total reduction	30,000.00
Net increase	19,460.00

Comparative statement showing the appropriations for 1894, the estimates for 1895, the amounts provided by the House bill, and the amounts recommended by the Senate Committee on Appropriations for 1895.

Object.	Appropriations, 1894.	Estimates, 1895.	House bill, 1895.	Senate committee, 1895.
Pay of the Army	$13,256,789.78	$13,662,615.55	$13,040,934.68	$13,040,934.68
Subsistence of the Army	1,700,000.00	1,745,886.25	1,650,000.00	1,665,000.00
Regular supplies, Quartermaster's Department	2,525,000.00	2,566,479.42	2,400,000.00	2,400,000.00
Incidental expenses, Quartermaster's Department	650,000.00	650,000.00	600,000.00	600,000.00
Horses for cavalry and artillery	130,000.00	178,625.46	100,000.00	100,000.00
Transportation of the Army and its supplies	2,600,000.00	2,700,000.00	2,500,000.00	2,500,000.00
Barracks and quarters	700,000.00	750,000.00	650,000.00	650,000.00
Construction and repair of hospitals	50,000.00	80,000.00	45,000.00	45,000.00
Shooting galleries and ranges	8,000.00	17,223.00	15,000.00	15,000.00
Purchase of land for rifle range at Sacketts Harbor, N. Y.	----------	----------	----------	10,000.00
Quarters for hospital stewards	7,000.00	10,000.00	7,000.00	7,000.00
Clothing, and camp and garrison equipage	1,200,000.00	1,406,217.30	1,200,000.00	1,200,000.00
Contingencies of the Army	15,000.00	15,000.00	15,000.00	15,000.00
Total Quartermaster's Department.	7,885,000.00	8,373,545.18	7,532,000.00	7,542,000.00
Medical and hospital supplies	185,500.00	185,500.00	160,500.00	175,500.00
Army Medical Museum	5,000.00	5,000.00	5,000.00	5,000.00
Library of the Surgeon-General's Office	7,000.00	10,000.00	7,000.00	10,000.00
Total Medical Department	197,500.00	200,500.00	172,500.00	190,500.00
Engineer depot at Willetts Point, N. Y.	11,000.00	12,000.00	10,000.00	10,000.00
Current expenses, Ordnance Department.	80,000.00	125,000.00	100,000.00	100,000.00
Manufacture of metallic ammunition, etc.	180,000.00	200,000.00	180,000.00	180,000.00
Repairing ordnance and ordnance stores in hands of troops, etc	5,000.00	10,000.00	5,000.00	5,000.00
Ordnance stores to fill requisitions of troops	115,000.00	125,000.00	115,000.00	115,000.00
Infantry, cavalry, and artillery equipments	190,000.00	215,000.00	190,000.00	190,000.00
Overhauling, etc., new ordnance stores at arsenals	5,000.00	5,000.00	5,000.00	5,000.00
Replacing ordnance and ordnance stores issued to the National Guard, District of Columbia	----------	45,621.54	----------	----------
Supplying ordnance and ordnance stores to the National Guard, District of Columbia	----------	5,000.00	----------	----------

Comparative statement showing the appropriations for 1894, etc.—Continued.

Object.	Appropriations, 1894.	Estimates, 1895.	House bill, 1895.	Senate committee, 1895.
Harness and equipments for horses and enlisted men of the Signal Corps	.....	$10,000.00	.....	.....
Firing the morning and evening gun at military posts	$20,600.00	35,000.00	$20,600.00	$20,600.00
Targets for artillery practice	6,000.00	6,000.00	6,000.00	6,000.00
Manufacturing arms at the national armories	400,000.00	400,000.00	400,000.00	400,000.00
Purchase of machine guns	.....	(*a*)	20,000.00	10,000.00
Total, Ordnance Department	1,001,600.00	1,181,621.54	1,041,600.00	1,031,600.00
Expenses of recruiting	130,000.00	130,000.00	120,000.00	100,000.00
Signal Service, viz:				
General expenses	22,000.00	21,500.00	11,500.00	17,000.00
Construction of military telegraph line from Fort Ringgold to Fort McIntosh, Tex	17,000.00	.....	.....	.....
Construction of military telegraph line between El Paso and Fort Bliss, Tex	.....	.....	.....	960.00
Contingent expenses, commanding general's office	1,750.00	1,750.00	1,750.00	1,750.00
Contingent expenses, headquarters of military departments	3,000.00	3,500.00	3,000.00	3,000.00
Contingent expenses, military information division, Adjutant-General's Office	.....	(*b*)	3,640.00	3,640.00
Total for the Army	24,225,639.78	25,332,918.52	23,586,924.68	23,606,384.68

a Supplemental estimate for purchase of machine guns of $10,000.
b Supplemental estimate for contingent expenses, military information division, Adjutant-General's Office, of $3,640.

Army appropriation acts, 1888–1894.

1888	$23,724,718.00
1889	24,471,300.00
1890	24,316,615.73
1891	24,206,471.79
1892	24,613,529.19
1893	24,308,499.82
1894	24,225,639.78

APPENDIX.

General Schofield to the Secretary of War.

Headquarters of the Army,
Washington, March 15, 1894.

Respectfully submitted to the Secretary of War.

It would, in my judgment, be seriously injurious to the military service to so reduce the officers in the Medical Corps that there would no longer be the necessary number of surgeons for permanent duty at the various military posts. Medical service may doubtless be employed for officers stationed in cities, and perhaps in some cases at much less expense than the salaries of a surgeon; yet when it is remembered that the Army surgeons stationed in cities besides attending the officers there perform the very important duty of examining recruits, it is probable that the service rendered is less expensive as well as far more efficient than that which could be hired by the visit. At military posts it is, in my judgment, impracticable to supply the necessary service, including that in the hospitals, in any other way than through the regular commissioned officer.

So far as I am informed, the experience of late years shows that the Medical Corps of the Army is none too large for the necessities of the service.

If these views meet with the concurrence of the Secretary of War, I respectfully suggest that they be communicated to the committee in Congress having this matter in charge.

J. M. Schofield,
Major-General Commanding.

SURGEON-GENERAL TO THE CHAIRMAN OF THE COMMITTEE ON APPROPRIATIONS, U. S. SENATE.

WAR DEPARTMENT, SURGEON-GENERAL'S OFFICE,
Washington, May 5, 1894.

SIR: I have the honor to transmit herewith copies of certain official documents relating to the proposed reduction of the number of assistant surgeons in the Army (H. R. 6373, p. 6), and to request that they may be submitted to your committee for consideration in advance of any action upon the appropriation bill, in which this new legislation is introduced.

I respectfully call attention to the fact that the Commanding General of the Army and the commanding generals of the several military departments all state in positive terms that the number of medical officers is not in excess of the legitimate demands of the military service.

Should the evidence submitted not be considered sufficient to establish this, I respectfully ask that I may be given a hearing before the committee.

Very respectfully,

GEO. M. STERNBERG,
Surgeon-General U. S. Army.

Hon. F. M. COCKRELL, U. S. S.,
Chairman, Committee on Appropriations, U. S. Senate, Washington, D. C.

WAR DEPARTMENT, SURGEON-GENERAL'S OFFICE,
Washington, May 4, 1894.

SIR: I have the honor to invite your attention to certain mistakes made in statements of facts by members of the Military Committee during the discussion upon the proposition to reduce the Medical Corps of the Army.

In the Congressional Record of April 29, page 5128, Mr. Hull says: "We have to-day the same number of officers in the Medical Department as in 1867." This is a mistake. In 1867 there were 222 commissioned officers in the Medical Department. This number was reduced by the act of June 23, 1874, to 209, and further reduced by the act of June 26, 1876, to 196. Since this date we have lost 4 medical storekeepers by the action of the law enacted June 26, 1876, so that the total number now allowed by law is 192.

In the Congressional Record of May 1, page 5159, the same gentleman says: "But let me call your attention to some instances where I think this change may be practicable that is suggested by the committee. Take, for instance, the city of Omaha. We find that in Omaha in 562 men, all told, there are 4 surgeons. At Chicago, I think, there are 5 surgeons. At Leavenworth, there are 4. At Columbus, where the chairman of the Committee on Military Affairs [Mr. Outhwaite] resides, where there are very few men, there are 5 surgeons. Now, I believe that 2 surgeons would do the work there just as well as 5."

With reference to Omaha I would say that this is the headquarters of a military department, and one of the medical officers referred to is the medical director of the department. It is always deemed necessary to have at least one medical officer at or near department headquarters for emergencies which are constantly arising, with detachments of troops to take the place of medical officers who may be taken sick, etc. In this connection I call attention to the inclosed copy of a letter from Gen. Brooke, commanding the Department of the Platte, whose headquarters are at Omaha. (*See* Inclosure 1.)

There are but two medical officers on duty in Chicago* instead of five as stated. One of these is medical director of the Department of the Missouri, under the command of Maj. Gen. Miles; the other, attending surgeon and examiner of recruits in the city of Chicago. Fort Sheridan is 25 miles from the city of Chicago. It is a large post, and requires three medical officers; these, of course, can not properly be counted as in Chicago. As a matter of fact, I have been obliged to draw upon this post for a medical officer required for an emergency, in response to the following telegram from the commanding general of the Department of the Columbia:

VANCOUVER BARRACKS, *Washington, April 30, 1894.*

ADJUTANT-GENERAL, U. S. ARMY,
Washington, D. C:

Need a medical officer at once at Fort Spokane to replace Surg. Hubbard, who is ill, and has applied for sick leave. None available in this department. Desire another medical officer to attend troops if called out to meet prospective emergencies and request that he be sent if practicable.

OTIS, *Commanding.*

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*Also one on temporary duty to take the place of the medical director who will be retired for age next month.

At Columbus there is a large recruiting depot, and the number of sick is greater than at any other post in the Army, as is shown by my annual report for the fiscal year ending June 30, 1893, from which I quote as follows:

"When it is stated that at Columbus Barracks the admissions for venereal diseases numbered 292.72 per 1,000 of strength, and that these accounted for a nonefficiency of 18.54, the causation and general character of the excess of sickness may easily be understood. Instead of undergoing a systematic course of athletic exercise to develop their physique, nearly 30 per cent of these recruits pass a great part of their period of instruction on the sick list for diseases resulting from dissipation."

The statement that there are 5 medical officers at Columbus is a mistake; there are but 3, 1 having been recently sent there in compliance with the recommendation of the superintendent of the general recruiting service, and I quote from his letter, a copy of which is transmitted herewith (*see* inclosure 2):

"It will, therefore, be readily apparent that no reduction of medical officers is possible, and in view of the large number of men requiring close scrutiny, and to insure efficient service, with a fair division of labor and reasonable recreation to medical officers charged with such onerous and responsible duties, a third medical officer would find abundant employment and gain valuable experience, especially a young assistant surgeon."

Mr. Hull further says: "By contracting with physicians in civil life you can employ a man to look after those soldiers whom the Government is compelled by the terms of contract to supply with medical assistance for less than one-fourth the amount which it costs to keep these surgeons. That is the point I want to get at. Take the list on page 8 of the report, and you will find that in a large number of cases, for instance at Plattsburg, N. Y., where they have 18 or 20 men,* you could employ a surgeon for one-twentieth what it costs to keep one surgeon there."

I respectfully call attention to the fact that the Commanding General of the Army says: "At military posts it is, in my judgment, impracticable to supply the necessary service, including that in the hospitals, in any other way than through the regular commissioned officer."

This opinion is concurred in by all the commanding generals of military departments, as is shown by official letters which have heretofore been transmitted to the Committee on Military Affairs of the House.

The remarks of the chairman of the committee (Congressional Record of May 1, p. 5161) indicate that he is under a misapprehension with reference to the assignment of medical officers to duty as "attending surgeons and examiners of recruits at several of the larger cities." This is not a new thing, as he seems to think. Medical officers have been continuously assigned to this duty in the cities of New York, Chicago, Philadelphia, and Baltimore for many years past, and at times, when they could be spared, in the cities of Boston, St. Louis, and San Francisco.

By authority of the Secretary of War I have simply changed the method of making these details. Instead of detailing senior medical officers for several years, junior officers (captains) who are soon to be examined for promotion are detailed for a single year in order that they may devote any time at their disposal, after performing the duties required of them, for their professional advancement by attending lectures and clinics given by the distinguished physicians and surgeons in those medical centers. After having been stationed at isolated posts for fifteen to twenty years, as is usually the case with these officers, such advantages are highly appreciated and will do much toward maintaining a high standard of professional efficiency. Although authorized by the Secretary of War to assign a medical officer to duty as attending surgeon and examiner of recruits at St. Louis, I have not been able to spare one for this duty and no detail has been made. The one detailed in San Francisco has been relieved because his services were needed elsewhere. I transmit his report, showing the nature of his duties as attending surgeon and examiner of recruits in that city. (*See* inclosure 3.)

With reference to the examination of recruits the chairman of the committee says: "As to the suggestion that these men were assigned to these places in order to examine recruits there is no foundation for that. Previous to one year ago there was no examination of recruits at the cities named in the order I have referred to. Recruits at that time were sent a little farther on. At Baltimore, probably, they were examined at Fort Henry; at New York they were perhaps examined at one of the forts in the harbor or at the recruiting depot, Davids Island; at Boston they could have been examined at Fort Warren; at Chicago, at Fort Sheridan, and so at other points. So that there was no necessity that had not been already recognized."

This again is a mistake. Recruits have been examined by the "attending surgeon" in the cities of Chicago, Philadelphia, and Baltimore for many years past.

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* As a matter of fact, there are 59 officers and men at Plattsburg and 30 civilians entitled to medical treatment, and 4 additional companies of infantry are under orders to take station at that post.

But in New York this duty was performed by a physician of the city employed for the purpose, there being at the same time an "attending surgeon" stationed in the city of New York. The private physician who examined recruits received $135 per month up to the year 1889 and after that $175 per month. In 1891, on the score of economy, his services were dispensed with and the attending surgeon was required to examine recruits.

To take the numerous applicants for enlistment at the two recruiting depots in New York City and one in Brooklyn to one of the military posts in New York Harbor for examination would be expensive and extremely inconvenient. So far as I know the idea of so doing has never before been suggested. In Chicago the "attending surgeon" has for many years examined the numerous applicants for enlistment. To send all of them to Fort Sheridan would add greatly to the expense of the recruiting service. A considerable proportion of those who present themselves are rejected by the examining surgeon, and it is generally recognized in the Army that such examinations should, whenever practicable, be made by a medical officer of the Army who is a trained expert in the physical examination of recruits.

With reference to the Army medical school there seems to be a serious misapprehension. This was established, not by an "order of the Surgeon-General," but by an order of the Secretary of War, upon my represention of the desirability of such a school, which is generally recognized in the Army and by the leading members of of the medical profession throughout the country. This school was established by command of Maj. Gen. Scofield and by direction of the honorable the Secretary of War, just as the schools of instruction at Fort Leavenworth and at Fort Monroe were established for the instruction of line officers. As I understand it, there has been no encroachment upon the authority of Congress. The school was established by the following order, which designates the Army Medical Museum in this city as the place where "approved candidates" shall receive a four month's course of instruction "in their duties as medical officers." Such instruction is not given at any medical college in the country, and is very important for young doctors just entering the Army. The professors, as prescribed by the order, are selected "from among the senior medical officers of the Army stationed in or near the city of Washington." All of them are upon other necessary duty, and the four months' course of instruction annually is given in addition to their other duties and without interfering with the same.

GENERAL ORDERS, }
No. 51. }

HEADQUARTERS OF THE ARMY,
ADJUTANT-GENERAL'S OFFICE,
Washington, June 24, 1893.

By direction of the Secretary of War, upon the recommendation of the Surgeon-General of the Army, an Army medical school will be established in the city of Washington for the purpose of instructing approved candidates for admission to the Medical Corps of the Army in their duties as medical officers.

The course of instruction will be for four months, and will be given annually at the Army Medical Museum, in Washington city, commencing on the 1st day of November.

Four professors will be selected from among the senior medical officers of the Army stationed in or near the city of Washington, and as many associate professors as may be required to give practical laboratory instruction in the methods of sanitary analysis, microscopical technique, clinical microscopy, bacteriology, urine analysis, etc.

The faculty of the Army medical school will consist of—

(1) A president of the faculty, who shall be responsible for the discipline of the school, and who will deliver a course of lectures upon the duties of medical officers in war and peace (including property responsibility, examination of recruits, certificates of disability, reports, rights and privileges, customs of service, etc.).

(2) A professor of military surgery (including the care and transportation of wounded).

(3) A professor of military hygiene (including practical instruction in the examination of air, water, food, and clothing from a sanitary point of view).

(4) A professor of clinical and sanitary microscopy (including bacteriology and urinology).

By command of Major-General Schofield.

R. WILLIAMS,
Adjutant-General.

I feel it my duty to the Medical Corps of the Army, and to the military service generally, that the apparent misunderstandings which seemed to have influenced the recommendation of the committee relating to a reduction of the Medical Corps

of the Army should be corrected, although action has already been taken by the House upon the bill reported by the Military Committee.

Very respectfully,

GEO. M. STERNBERG,
Surgeon-General, U. S. Army.

Hon. J. H. OUTHWAITE,
Chairman Committee on Military Affairs,
House of Representatives, Washington, D. C.

[Inclosure 1.]

HEADQUARTERS DEPARTMENT OF THE PLATTE,
Omaha, Nebr., March 27, 1894.

SIR: I have the honor to acknowledge the receipt of your letter of the 19th instant, in which, referring to the incorporation into the pending appropriation bill of a provision for the gradual reduction of the number of assistant surgeons from 125 to 90, you request me to state certain facts relative to the medical service in this department and pertinent to the question of the expediency of the proposed reduction. In reply I beg to advise you as follows:

The number of medical officers on duty at the several posts in the department is sufficient for the performance of the duties devolving upon them at the present time. It is not, however, more than sufficient, and none could be spared without prejudice to the interests of the public service.

The employment by the visit under Army Regulations 1637, of private physicians living near military posts requiring medical attendance, does not in the long run conduce to the advantage of the service in my judgment. It has been tried at two of the smaller posts in the department, Fort Sidney, Nebr., and Camp Pilot Butte, Wyo. In neither case was the result satisfactory except that it effected a slight saving in expense. The only available physician at the former post was reported as lacking the requisite qualifications for the work; and although there was no objection on the score of incompetency to the civilian doctor who in the absence of a medical officer performed the sanitary service at Pilot Butte from August 10, 1893, to March 9, 1894, the management of the hospital, the discipline of the hospital-corps detachment, and the care of the hospital property was not what it ought to have been and would have been had such an officer been on duty at the camp.

The above statement is believed to be a full answer to the specific questions propounded. I would add that as commander of various frontier posts for more than twenty years of my life, I found the proper supply of medical attendance to be among the most serious and troublesome problems with which I had to deal. There is less difficulty in this respect at this time; but even now, as department commander, I find it not always an easy matter to secure the services of medical officers for troops when detached from their posts for duty in the field. It must be borne in mind that not only the health of the individuals composing a military command, but also its discipline as a body depends, in a large degree, upon the medical officer who is assigned to duty with it. A sufficient knowledge of medicine and surgery, though essential, does not complete the requisite professional equipment of the military physician. To be thoroughly efficient as such he must be conversant with the ways and customs of the service, the peculiar characteristics of its personnel, and the requirements of discipline, and an acquaintance with these can be acquired only by actual service with troops for a period of years.

After a careful consideration of the subject, I am fully convinced that the medical department as now constituted is none too large and that its reduction would lessen the efficiency of the military service.

Very respectfully, your obedient servant,

JOHN R. BROOKE,
Brigadier-General, Commanding.

The SURGEON-GENERAL, U. S. ARMY,
Washington, D. C.
(Through the Adjutant-General.)

[Inclosure 2.]

HEADQUARTERS OF THE RECRUITING SERVICE, ARMY BUILDING,
New York City, March 27, 1894.

SIR: I have the honor to acknowledge receipt of your communication of the 19th instant, in reference to the number of medical officers required for duty at each of the recruiting depots (Davids Island, New York Harbor; Columbus barracks,

Ohio; and Jefferson barracks, Mo.), and the necessity or advisability of having the examination of recruits at rendezvous made by officers of the Medical Department, and I reply as follows:

The average strength of the recruiting depots during the years of 1892 and 1893 has been—

	1892.	1893.
Jefferson barracks, Mo	555	508
Davids Island, New York Harbor	608	549
Columbus barracks, Ohio	662	701

The average number sick at the three depots has been—

	1892.	1893.
Jefferson barracks, Mo	$13\frac{3}{12}$	$16\frac{5}{12}$
Davids Island, New York Harbor	$21\frac{5}{12}$	$21\frac{10}{12}$
Columbus barracks, Ohio	$37\frac{9}{12}$	$56\frac{3}{12}$

Besides a thorough reexamination of every recruit arriving at each of these depots there is really quite a large number and variety of cases of sickness developed among men new to the service requiring treatment and close medical attention and giving constant employment to the two medical officers on duty at each depot.

There were two medical officers constantly on duty at each of the recruiting depots during the years 1892 and 1893, with the following exceptions: From May, 1892, to February, 1893, a junior medical officer was on duty at each of the depots in addition to the two previously mentioned, and at Columbus barracks, Ohio, from May to October, 1892, and from May to December, 1893, a junior medical officer was on duty under like condition.

At the present time there are two officers of the Medical Department on duty at each of the recruiting depots.

The strength of the garrison at each of the two general service depots has been nearly twice the size of many of the large military posts, while the number at the cavalry depot has equalled the strength of a cavalry regiment.

It will, therefore, be readily apparent that no reduction of medical officers is possible, and in view of the large number of men requiring close scrutiny, and to insure efficient service, with a fair division of labor and reasonable recreation to medical officers charged with such onerous and responsible duties, a third medical officer would find abundant employment and gain valuable experience, especially a young assistant surgeon.

At the following rendezvous and subdepots medical officers of the Army examine recruits:

Baltimore, Md.; Boston, Mass.; Buffalo, N. Y.; Chicago, Ill.; New York City, N. Y.; Philadelphia, Pa.; San Francisco, Cal.; St. Paul, Minn. At all other stations there are no medical officers of the Army.

The physical examination of a recruit discloses hidden defects, many of which can only be detected by an expert, and a line officer assigned to duty as recruiting officer is placed at great disadvantage in spite of his best efforts and the aid of Tripler's Manual, and is liable to make serious mistakes for which he is presumed to be and has sometimes been held responsible.

Medical officers of the regular department are best qualified to make the examination of recruits from their knowledge of Army methods and the special requirements enjoined by existing orders, and, as far as practicable, should be made available at all the more important rendezvous, especially in large cities; yet it is neither expected nor thought to be necessary that they should in all cases be supplied for the performance of such duties. When regular medical officers are not available, the employment of citizen physicians should be authorized, in the interest of economy, to avoid serious loss frequently incurred by the rejection of recruits upon the second examination at the depots.

I am, general, very respectfully, your obedient servant,

J. K. MIZNER,
Colonel Tenth Cavalry, Superintendent.

The SURGEON-GENERAL OF THE ARMY,
(Through the Adjutant-General of the Army.)
Washington, D. C.

[Inclosure 3.]

HEADQUARTERS DEPARTMENT OF CALIFORNIA,
San Francisco, April 18, 1894.

SIR: In compliance with instructions contained in letter dated November 17, 1893, from your office, I have the honor to submit the following report:

I have been on duty in San Francisco, Cal., from November 10, 1893, to April 14, 1894, as attending surgeon and examiner of recruits. During this period I have made about 250 visits to patients, each visit consuming from thirty minutes to one and a half hours. Have examined recruits on two or three days each week, such examination taking on an average one and a half hours. Have not kept any account of number of prescriptions written.

In addition to the above have made 5 visits to Angel Island during the sickness of the post surgeon; was in charge of medical director's office for one week. However, since March 28 have not examined recruits, being excused from this duty by department orders.

Such leisure as has remained after the performance of my military duties, I have devoted to studying my profession, as follows: A course of bacteriology with Dr. Mouser, extending over some ten weeks, and consuming about nine hours a week; a course of pathological histology with Dr. Spencer, which was not as extensive as I hoped, my change of station coming a little earlier than I anticipated. I, however, managed to obtain some 15 lessons, of three hours each, which have familiarized me with the ordinary technique of this subject, exclusive of paraffin mounting. These are the only two private courses of instruction which I have been able to undertake. I have seen and assisted in the performance of some 20 post mortems at the city morgue. I have been present at about 25 surgical operations, mainly abdominal work, through the kindness of San Francisco physicians. I have attended a small number of eye clinics at the public dispensaries and have devoted all available time to clinics on diseases of women. The above may seem a rather meager result from five months in the city, but San Francisco is not a place which offers special advantages to the student of medicine and surgery, and I can conscientiously aver that all time not absolutely taken up by my military duties has been earnestly applied to advancement in my profession. But it has been difficult to obtain profitable instruction, owing to the absence of public dispensaries and large hospitals, such as I am familiar with in New York and Philadelphia, and I have seen few of the major operations, notwithstanding the kindness and attention of the medical fraternity in this city. I may add that there is no winter session of the medical colleges.

Very respectfully,

W. R. HALL,
Captain and Assistant Surgeon, U. S. Army.

The SURGEON-GENERAL, U. S. ARMY
(Through the medical director, Department of California).

WAR DEPARTMENT, SURGEON-GENERAL'S OFFICE,
Washington, March 22, 1894.

SIR: I have the honor to transmit herewith a copy of a letter addressed this day to Hon. J. H. Outhwaite, chairman, relating to the proposed reduction in the Medical Corps of the Army, incorporated in the annual appropriation bill reported by the Military Committee of the House (H. R. 6373).

As a member of the Military Committee of the Senate I respectfully ask your attention to the reasons given in this letter for not reducing the Medical Corps, as proposed by the bill referred to.

Very respectfully,

GEO. M. STERNBERG,
Surgeon-General, U. S Army.

Hon. FRANCIS M. COCKRELL,
Committee on Military Affairs, U. S. Senate.

WAR DEPARTMENT, SURGEON-GENERAL'S OFFICE,
Washington, March 22, 1894.

SIR: In the report of the Committee on Military Affairs, "to accompany H. R. 6373," on page 3, certain reasons are given in support of the recommendation of the committee, which appear to be founded upon a misapprehension of the facts. The report says:

"When this Department was reorganized by law in 1869, there were 210 military

posts and stations in the country. This number has already been greatly reduced, so that there are now but 120 military posts and stations, and a still further reduction is proposed and will be effected with in a few years. It is evident that if 193 officers in this Department were sufficient when the number of posts and stations was 210, there can be as great a reduction as is proposed in this bill, when the number of posts and stations is reduced to 120."

As a matter of fact there were 184 acting assistant surgeons in service in 1870, after the reorganization referred to, and these acting assistant surgeons performed all the duties of medical officers. They were ordered wherever their sevices were required, were made responsible for medical property, and were available for duty as assistants at large posts or as post surgeons at small ones. As the number of posts was reduced and the exigencies of the service permitted, their number was reduced as is shown in the following table:

In service—

1870	184
1875	150
1880	111
1885	58
1890	48
1892	22

In the bill making appropriations for the support of the Army for the fiscal year ending June 30, 1893, no appropriation was made for acting assistant surgeons, and no contracts have been made for such service since that date. At present private physicians can only be employed by the visit, and there is no provision of law by which they can be placed in charge of the medical department at a military post. They are, therefore, not available for taking charge of a post hospital and the medical and hospital property necessary for care of the sick and wounded of a garrison, or for the discipline and drill of the hospital corps detachment, or for the sanitary supervision of the post, or for medical services to the families of officers and enlisted men.

On page 4 the following statement is made:

"It may be necessary in several instances to employ outside attendance of physicians for these smaller posts, but that can always be done and efficient services secured at a cost of from one-fifth to one-fourth of the present average of salaries of the officers in the corps. This kind of service is furnished in some instances, as is shown by a letter from the Surgeon-General, which forms a part of this report and is marked C."

It is a mistake to suppose that private physicians could be employed at the smaller garrisons where medical officers are now stationed for "from one-fifth to one-fourth of the present average of salaries of the officers of the corps."

The list of stations where private physicians are now employed includes all of the arsenals in the country, and, as will be seen by reference to table on pages 8, 9, and 10 of your report, the number of officers and enlisted men at these arsenals is comparatively small—Allegheny, 31; Augusta, 29; Columbia, 21; Frankfort, 47, etc. Medical officers of the Army have not been stationed at any of the arsenals, with the exception of Watervliet, for several years past, and I fully agree with the committee that a proper regard for economy requires that these arsenals should be attended by private physicians, by the visit, as at present.

But it is different with a garrisoned post, whether large or small. The medical officer is required for various important duties in addition to the care of the sick, and his presence as a member of the garrison is more important than that of any other single officer, for no other officer can perform his duties, whereas any officer of the line present can perform the duties of quartermaster, commissary, adjutant, or commanding officer of a company or garrison. I respectfully call attention to the opinion of the Major-General Commanding the Army (p. 12 of the report of the committee), who says:

"At military posts it is, in my judgment, impracticable to supply the necessary service, including that in the hospitals, in any other way than through the regular commissioned officer."

As I understand the matter, the principal reason for supporting an army in time of peace is in order that an efficient organization may be maintained which may be ready for service in any emergency, and may serve as a nucleus for the larger army which would be required in case of war. The private physician, employed by the visit, does not belong to the military organization, and is not available for duty with the troops constituting a garrison when they are ordered to take the field either for practice or for actual service. When the whole or a portion of a garrison, whether large or small, is ordered into the field the demand at once arises for two medical officers, one to accompany the command and one to remain in charge of the sick in

hospital and to attend the wives and children of the officers and enlisted men who necessarily remain at the post.

Even if all other interests were set aside on the score of economy I doubt whether half a dozen of the smaller garrisons, in addition to those given in my list (page 11 of report), could be supplied with satisfactory medical attendance at less cost than the pay of an assistant surgeon of the Army ($133.33 per month).

The committee says: "In time of peace these men and officers should be, generally speaking, in sound health, physically and mentally." Great care is exercised in the examination of recruits, and they are in sound health physically and mentally at the date of enlistment, but under the most favorable circumstances a considerable number require the services of a physician after enlistment. This is shown by the fact that at the three recruiting depots, all in comparatively healthy locations, the average number on sick report every day during the year ending June 30, 1893, was as follows:

Columbus barracks	42.5
Davids Island	25.7
Jefferson barracks	16.3

The average number sick daily at Washington barracks, with a total garrison of 339, was 14.3; at Fort Sam Houston, with a total garrison of 707, it was 25.8.

An important part of the duty of a medical officer in a garrison is to decide whether enlisted men who report sick are really unfit to perform their duties, or whether they feign sickness for the purpose of avoiding these duties. The private physician, called in by the visit, is not present at "sick call" to determine this question, and when it is left to the decision of a nonprofessional person—company officer or noncommissioned officer—the man who feigns sickness has a better chance of success, and the really sick man is often compelled to do duty because he is suspected of malingering.

While, in my opinion, private physicians can not satisfactorily take the place of medical officers at garrisoned posts, it would be practicable to furnish medical attendance by the visit at the headquarters of several military departments where "attending surgeons" are now stationed more economically than under the present arrangement. And as I desire to carry out the economic views of the Military Committee as fully as is practicable, I shall recommend the assignment of these medical officers to other duty. But when this is done we will not have any medical officers to spare, and I am at a loss to see how the demands of the service can be properly met if the proposed reduction is made. There are now five vacancies in the corps and five medical officers absent sick. If those on duty should have a leave of absence of one month for each year of service, fifteen would be constantly absent and it would be necessary to fill their places. But the exigencies of the service are such that it is often impracticable to grant leaves of absence to deserving officers who are entitled to such leave under the general regulation which gives an officer one month in each year without loss of pay.

Very respectfully,

GEO. M. STERNBERG,
Surgeon-General, U. S. Army.

Hon. J. H. UTHWAITE,
Chairman Military Committee, House of Representatives.

WAR DEPARTMENT, SURGEON-GENERAL'S OFFICE,
Washington, March 24, 1894.

SIR: I have the honor to transmit herewith for your information a tabular statement showing the military stations, the number of medical officers on duty at each, and the daily average sick rate.

Very respectfully,

GEO. M. STERNBERG,
Surgeon-General, U. S. Army.

Hon. FRANCIS M. COCKRELL,
Committee on Military Affairs, U. S. Senate.

Population of military stations, U. S. Army, with medical officers on duty, and daily average sick.

[Army regulations cited in the following table:
Par. 1634. Medical officers where on duty shall attend officers and enlisted men and, whenever practicable, their families; and at stations or in the field, where other medical attendance can not be procured, civilian employés. Medicines will be dispensed to all persons entitled to medical attendance, and hospital stores to enlisted men and hospital matrons, and also to officers at posts or stations where they can not be procured by purchase.
Par. 1635. Medical officers at their stations will furnish medical attendance to officers and enlisted men on the retired list, but they shall not be required to leave their stations for that purpose. Medicines, dressings, etc., will be supplied to retired officers and enlisted men from Army dispensaries on medical officers' prescriptions.
The number of civilians entitled to medicine and the stations of medical officers are given as reported on March 20, 1894. The mean strength, officers and men, is as reported December 31, 1893, since which time few changes have taken place.
The daily average sick and the number of recruits examined are taken from the Annual Report of the Surgeon-General for the year ending June 30, 1893.]

Stations.	Strength, officers and enlisted men.	Daily average sick.	Civilians entitled to medical treatment under Army Regulations.	Medical officers.	Remarks.
Adams	270	8.09	187	2	
Alcatraz	125	4.72	91	1	
Allegheny arsenal	31	1.79	38	.....	1 attending physician.
Angel Island	303	10.11	61	1	
Apache	218	7.73	74	2	1 for field service.
Assinniboine	579	18.65	205	3	Do.
Augusta arsenal	29	.46	34	.....	1 attending physician.
Baltimore	30	.....	32	1	Including 5 retired officers and 18 retired enlisted men; 451 recruits examined.
Barrancas	69	5,30	76	1	
Bayard	385	17.65	195	2	
Benicia barracks	228	3.66	88	1	
Bliss, old and new	351	2.70	114	2	1 required at each place.
Boise barracks	120	2.22	39	1	
Boston	22	.....	80	1	Including 11 retired enlisted men; 769 recruits examined.
Bowie	104	6.11	40	1	
Brady	177	3.35	56	1	
Brown	109	2.18	35	1	
Buford	318	6.08	150	2	
Canby	112	5.81	55	1	Including 8 retired enlisted men; 1436 recruits examined; department headquarters.
Chicago	63	45	99	1	
Clark	216	19.51	110	2	1 for field service.
Columbia arsenal	21	1.62	13	.....	1 attending physician.
Columbus barracks	569	42.54	87	3	Recruiting depot.
Columbus, Fort	190	9.35	266	2	Department headquarters.
Custer	402	20.20	172	2	1 absent on leave.
D. A. Russell	482	13.55	179	3	Hospital corps company of instruction.
Davids Island	453	25.71	95	2	Recruiting depot.
Denver	33	.....	143	1	Including 5 retired enlisted men; department headquarters.
Douglas	534	16.19	130	2	
DuChesne	118	4.47	72	1	
Eagle Pass	58	4.04	28	1	
Frankford arsenal	47	1.30	48	.....	1 attending physician.
Grant	338	13.61	97	2	1 for field service.
Hamilton	281	12.57	105	1	
Hancock	48	2.23	12	1	
Hot Springs	39	24.18	30	2	Army and Navy General Hospital.
Huachuca	357	7.80	125	2	1 absent on leave.
Indianapolis arsenal	29	.87	16	.....	1 attending physician.
International boundary Commission	56	.....	27	1	
Jackson barracks	121	6.10	37	1	
Jefferson barracks	386	16.36	121	2	Recruiting depot.
Kennebec arsenal	15	.32	21	.....	1 attending physician.
Keogh	479	14.46	253	2	1 for field service.
Key West barracks	56	.....	25	.....	1 attending physician.
Leavenworth, Fort	769	24.40	348	3	
Leavenworth prison	124	3	667	1	
Logan	366	11.49	96	2	1 for field service.
Mackinac	64	1.77	28	1	
Madison barracks	357	11.46	127	2	
Marcy	143	6.95	62	1	
Mason	68	1.26	48	1	

Population of military stations, U. S. Army, etc.—Continued.

Stations.	Strength, officers and enlisted men.	Daily average sick.	Civilians entitled to medical treatment under Army Regulations.	Medical officers.	Remarks.
McHenry	187	8.05	69	1	
McIntosh	220	10.27	74	2	1 for field service.
McKinney	288	12.25	134	2	Do.
McPherson	453	23.16	171	2	
Meade	395	18.55	186	2	
Missoula	196	3.90	132	1	
Monroe	508	17.02	380	2	
Mount Vernon barracks	184	9.02	381	1	1 attending physician.
Myer	270	9.57	86	1	
Newport barracks	61	2.02	37	.....	The sick are attended by the post surgeon of Fort Thomas, Ky.
New York	114	.....	359	1	Including 29 officers and 41 enlisted men (retired); 950 recruits examined.
Niagara	175	5.52	90	1	
Niobrara	496	13.27	124	2	
Omaha	40	.....	249	1	Including 4 retired enlisted men; department headquarters.
Omaha, Fort	512	16.17	114	4	2 absent sick.
Ontario	61	2.03	23	1	
Pembina	59	.51	36	.....	1 attending physician.
Philadelphia	63	.....	34	1	981 recruits examined.
Pilot Butte	57	1.50	9	1	
Plattsburg barracks	59	1.56	30	1	
Porter	115	3.77	65	1	
Preble	69	2.85	39	1	
Presidio	619	16.50	497	4	2 for field service.
Reno	320	21.35	180	2	1 for field service.
Riley	680	19.17	308	4	Hospital corps company of instruction.
Ringgold	170	9.40	91	1	
Robinson	492	9.77	299	2	
Rock Island arsenal	68	1.40	42	.....	1 attending physician.
St. Francis barracks	140	5.61	40	1	
St. Paul	43	.....	132	1	455 recruits examined; department headquarters.
Sam Houston / San Antonio *	707	25.82	489	3	
San Carlos	190	7.22	39	2	1 under orders for Fort Huachuca.
San Diego barracks	74	5.44	34	1	
Sandy Hook	70	.99	81	.....	Sick attended by post surgeon, Fort Columbus, N. Y.
San Francisco	82	.....	224	1	Including 10 retired officers and 33 retired enlisted men; 165 recruits examined; department headquarters.
Schuyler	117	3.30	76	1	
Sheridan	665	18.09	260	4	1 medical officer absent with leave (four months).
Sherman	395	5.97	154	2	1 absent on leave.
Sidney	207	3.62	47	1	
Sill	279	12.89	386	2	
Snelling	472	17.95	229	2	
Spokane	69	3.41	27	1	
Springfield armory	34	.39	35	.....	1 attending physician.
Stanton	113	4.85	52	1	
Sully	175	7.04	78	1	
Supply	214	12.55	141	2	
Thomas	389	11.31	126	2	
Townsend	65	.87	33	1	
Trumbull	69	2.30	44	1	
Vancouver barracks	464	11.44	228	2	Department headquarters.
Wadsworth	189	3.59	95	1	
Walla Walla	206	7.66	90	1	
Warren	119	2.55	84	1	
Washakie	167	3.14	119	1	
Washington	348	.....	1,113	2	Including 103 retired officers and 118 retired enlisted men.
Washington barracks	339	14.35	101	3	Hospital corps company of instruction.
Washington Soldiers Home.	4	.....	864	1	Including 3 retired officers and 758 discharged soldiers.
Watertown arsenal	40	.52	31	.....	1 attending physician.
Watervliet arsenal	61	3.35	67	.....	Do.
Wayne	252	11.83	94	1	
West Point cadets	370	.....	197	2	
West Point soldiers	329	9.60	476	1	
Whipple Barracks	188	7 98	119	1	

*Department headquarters.

Population of mititary stations, U. S. Army, etc.—Continued.

Stations.	Strength, officers and enlisted men.	Daily average sick.	Civilians entitled to medical treatment under Army Regulations.	Medical officers.	Remarks.
Willets Point	392	11.78	351	2	
Wingate	460	12.93	161	2	
Wood	67	.25	39	.....	Sick attended by post surgeon, Fort Columbus, N. Y.
Yates	221	16.83	139	2	1 required for field service.
Yellowstone	145	1.80	37	1	
Total	27,487	.....	15,944	165	

On duty with troops	165
Surgeon-General's office and Medical Museum	6
Medical directors at headquarters of military departments	8
In charge of medical supply depots	3
Permanently disabled or on sick leave	4
On temporary duty at headquarters, Department of the Missouri, during the temporary absence of the medical director in Europe	1
Vacancies	5
Total	192

Military Telegraph Line Between El Paso and New Fort Bliss, Tex.

War Department,
Washington, D. C., May 1, 1894.

Sir: Referring to House bill 6373, Fifty-third Congress, second session, making appropriation for the support of the Army for the fiscal year ending June 30, 1895, which passed the House of Representatives on the 30th ultimo, and is now pending in the Senate Committee on Appropriations, I have the honor to advise you that in the opinion of the commanding general, Department of Texas, the construction and maintenance of a military telegraph line between New Fort Bliss and El Paso, Tex., is regarded as a military necessi'y.

Upon the abandonment of old Fort Bliss the military situation will make a telegraph connection between the new post and El Paso absolutely essential, and as the garrisons on the Rio Grande are at all times liable to be called upon to meet sudden and unexpected emergencies requiring prompt and reliable transmission of orders, it is recommended that a clause be inserted in the pending Army bill which will provide for this line, and it is suggested that the clause should read as follows: "For constructing and operating a military telegraph line between El Paso, Tex., and New Fort Bliss, Tex., $960," this sum being the estimated cost for building the line.

Very respectfully,

Daniel S. Lamont,
Secretary of War.

The Chairman of the Committee on Appropriations,
U. S. Senate.

Indian Prisoners of War at Mount Vernon Barracks, Ala.

War Department, Office of the Secretary,
Washington, May 19, 1894.

Sir: Mr. Cleaves' telegram sent me this morning, and containing the phraseology of the proposed amendment to the Army appropriation bill respecting the removal of the Indian prisoners of war from Mount Vernon Barracks, Ala., to Fort Sill, Ind. T., was received.

After further consideration and consultation with the Quartermaster-General, I have the honor to hand you a memorandum, herewith inclosed, in which the several tems of expense that will be incurred in the establishment of these Indians at Fort Sill are set forth in some detail.

I am authorized by the Secretary of War to hand you this statement and to say that the amount estimated for is as small as can possibly be made to cover the extra expenses that must be met—the cost of removal and general subsistence to be covered from the regular appropriations for support of the Army, as heretofore.

I beg to suggest the substitution of $15,000 for $10,000, and a few slight verbal changes in the proviso.

Yours, very sincerely,

GEO. W. DAVIS,
Captain, Fourteenth Infantry.

Hon. JOS. C. S. BLACKBURN,
Chairman Subcommittee of Committee on Appropriations, U. S. Senate.

Memorandum concerning the establishment of the Indian prisoners of war at Fort Sill, Ind. T., who are now confined at Mount Vernon Barracks, Ala.

Healthy and able-bodied:		
Men	13	
Women	102	
Boys and girls over 12	21	
Boys and girls under 12	103	
Total		239
Sickly and infirm:		
Men and women	63	
Boys and girls over 12	1	
Boys and girls under 12	16	
Total		80
Indian soldiers		47
Grand total		366

These 366 persons constitute about 70 families of 5 persons each.

A house of two rooms and attic, built of rough lumber, unpainted, lined inside with tar paper (all labor in erection of building to be done by Indians) will cost at least $100.

A plat of say 10 acres of good land (to be afterwards increased to say 40 acres if necessary) to be assigned to each family, all upon the present military reserve at Fort Sill.

The Indians will not be able to make a crop until the autumn of 1895, and meanwhile must be supported by the Government.

Agricultural implements, tools, and draft animals will be indispensable—$100 for each family for this purpose will be a very small allowance—utilizing also the draft animals and other conveniences as far as possible now in use by troops at Fort Sill.

The plats of ground cultivated will have to be fenced, and these inclosures will be made by labor of the Indians so far as available materials will allow, but barbed wire, hinges, etc., must be provided, to be strung on fence posts cut from public lands. The wire etc., will cost, say $1,000.

The estimate will then stand:

Materials for houses for 70 families, at $100 each	$7,000
Agricultural implements, wagons, tools, seeds, and draft animals for 70 families, at $100 each	7,000
Wire and other materials for fencing cultivated plats of ground	1,000
Total	15,000

This amount is regarded as an absolute minimum, and the best management and strictest economy will be necessary to keep, within the amount.

The transportation of the Indians from Mount Vernon to Fort Sill, their subsistence at that post for the coming fiscal year; their medical attendance, pay of the present interpreter, who is also an overseer, to be paid from the regular Army appropriation, as heretofore.

A discreet Army officer to be detailed and placed in control, and the whole band held in strict military discipline.

There is already at Fort Sill an Indian school, and it is supposed the children of these Apaches can there receive necessary instruction.

The present garrison of Fort Sill consists of 3 troops of cavalry, and 2 companies of infantry, or about 300 men.

General Service Clerks and Messengers.

General service clerks and messengers now eligible for retirement according to telegraphic reports received from the various commanding officers, May 9, 1894.

	Clerks.	Messengers.	Total.
Headquarters of the Army	1	1	2
Department of California	1	1	2
Department of Colorado	0	0	0
Department of Columbia	1	0	1
Department of Dakota	0	0	0
Department of the East	2	0	2
Department of Missouri	*2	1	3
Department of Platte	2	1	3
Department of Texas	1	0	1
U. S. Military Academy	0	0	0
Headquarters recruiting service	1	1	2
Columbus barracks	0	0	0
Davids Island, N. Y	0	0	0
Jefferson barracks, Mo	0	0	0
U. S. Army dispensary	0	1	1
Total	11	6	17

* One of these 2 clerks eligible for retirement 11th instant.

N. B.—In addition to the foregoing, Department of Colorado reports 1 clerk will be eligible for retirement next November.

Army service rendered by general-service clerks and messengers to April 30, 1894.

Grade.	Clerks.		Messengers.	
	Number.	Per cent.	Number.	Per cent.
None	23	18	7	16
Less than one year	1	1	.....	.....
From one to five years	32	26	2	5
From five to ten years	39	31	5	11
From ten to fifteen years	19	15	16	35
From fifteen to twenty years	7	6	8	18
From twenty to twenty-five years	4	3	7	15
Total	125	100	45	100

Service in the "general service" rendered by general-service clerks and messengers to April 30, 1894.

Grade.	Clerks.	Messengers.
Less than one month	1	1
Less than one year	7	6
From one to five years	23	9
From five to ten years	38	22
From ten to fifteen years	32	2
From fifteen to twenty years	12	1
From twenty to twenty-five years	7	2
From twenty-five to thirty years	5	2
Total	125	45

Ninety-five clerks 76 per cent and 14 messengers 32 per cent less than ten years' Army service.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 471.

IN THE SENATE OF THE UNITED STATES.

JUNE 8, 1894.—Ordered to be printed.

Mr. BLACKBURN, from the Committee on Appropriations, submitted the following

REPORT:

[To accompany H. R. 6108.]

The Committee on Appropriations, to whom was referred the bill (H. R. 6108) making appropriations for the diplomatic and consular service of the United States for the fiscal year ending June 30, 1895, report the same to the Senate with various amendments, and submit herewith a comparative statement of the amount of the estimates for 1895 for the several branches of the service, the amounts provided by the bill as passed the House of Representatives, the amounts recommended by the committee, and the amounts appropriated for the fiscal year 1894.

Appended will be found letters of the Secretary of State relating to the bill and proposed amendments thereto.

DIPLOMATIC AND CONSULAR SERVICE, 1895.

Amount of estimates for 1895	$1,642,638.76
Supplemental estimates submitted	30,000.00
Total estimates	1,672,638.76
Amount of House bill	1,509,738.76
Net increase recommended by the committee	70,700.00
Total as reported to Senate	1,580,438.76
Amount of act for 1894	1,557,445.00

The changes in amounts of House bill recommended by the committee are as follows:

INCREASE.

Belgium, salary of envoy increased from $7,500 to $10,000	$2,500
Switzerland, salary of envoy increased from $6,500 to $7,500	1,000
Nicaragua, Costa Rica, and Salvador, secretary of legation	1,800
Interpreters to legations	3,000
Contingent expenses, foreign missions	5,000
Intercontinental Railway Commission	10,000
Barcelona, consul-general, increased from $1,500 to $2,500	1,000
Tangier, consul-general, increased from $2,000 to $2,500	500
Consuls, vice-consuls, and commercial agents, net increase	1,500
Allowance for clerks at consulates	4,400
Contingent expenses, U. S. consulates	30,000
Commercial Bureau of American Republics	10,000
Total increase	70,700

Comparative statement showing the appropriations for 1894, the estimates for 1895, the amounts provided by the House bill, and the amounts recommended by the Senate Committee on Appropriations for 1895.

Object.	Appropriations, 1894.	Estimates, 1895.	House bill, 1895.	Senate committee, 1895.
Salaries of ambassadors and ministers.				
Great Britain, France, Germany, and Russia, at $17,500 each	$70,000.00	$70,000.00	$70,000.00	$70,000.00
Italy	12,000.00	12,000.00	12,000.00	12,000.00
Mexico	17,500.00	17,500.00	17,500.00	17,500.00
Austria, Brazil, China, Japan, and Spain, at $12,000 each	60,000.00	60,000.00	60,000.00	60,000.00
Argentine Republic, Chile, Colombia, Peru, and Turkey, at $10,000 each	50,000.00	50,000.00	50,000.00	50,000.00
Guatemala and Honduras	10,000.00	10,000.00	10,000.00	10,000.00
Nicaragua, Costa Rica, and Salvador	10,000.00	10,000.00	10,000.00	10,000.00
Belgium	7,500.00	7,500.00	7,500.00	10,000.00
Denmark, Hawaiian Islands, Netherlands, Venezuela, Paraguay and Uruguay, and Norway and Sweden, at $7,500 each	45,000.00	45,000.00	45,000.00	45,000.00
Roumania, Servia, and Greece	6,500.00	6,500.00	6,500.00	6,500.00
Bolivia and Ecuador, at $5,000 each	10,000.00	10,000.00	10,000.00	10,000.00
Haiti	5,000.00	7,500.00	5,000.00	5,000.00
Switzerland	5,000.00	5,000.00	6,500.00	7,500.00
Portugal	5,000.00	5,000.00	6,500.00	6,500.00
Korea	7,500.00	7,500.00	7,500.00	7,500.00
Persia and Siam, at $5,000 each	10,000.00	10,000.00	10,000.00	10,000.00
Liberia	4,000.00	5,000.00	4,000.00	4,000.00
Cairo, agent and consul-general	5,000.00	5,000.00	5,000.00	5,000.00
Chargés d'affairs *ad interim* and diplomatic officers abroad	20,000.00	20,000.00	20,000.00	20,000.00
Total, ambassadors and ministers	360,000.00	363,500.00	363,000.00	366,500.00
Salaries of secretaries of embassies and legations, interpreters to legations, and clerk hire at legations.				
Great Britain, France, Germany, and Russia, secretaries, at $2,625 each	10,500.00	10,500.00	10,500.00	10,500.00
Italy, secretary	1,800.00	1,800.00	1,800.00	1,800.00
China and Japan, secretaries, at $2,625 each	5,250.00	5,250.00	5,250.00	5,250.00
Mexico	1,800.00	2,625.00	2,625.00	2,625.00
Korea	1,500.00	2,000.00	1,500.00	1,500.00
Colombia (Bogota), secretary and consul-general	2,000.00	2,000.00	2,000.00	2,000.00
Guatemala and Honduras, secretary and consul-general to Guatemala	2,000.00	2,000.00	2,000.00	2,000.00
Nicaragua, Costa Rica, and Salvador, secretary	----------	2,000.00	----------	1,800.00
Hawaiian Islands, secretary	----------	1,500.00	----------	----------
Austria, Brazil, Italy, and Turkey, secretaries, at $1,800 each	7,200.00	7,200.00	7,200.00	7,200.00
Argentine Republic, Chile, Peru, and Venezuela, secretaries, at $1,500 each	6,000.00	6,000.00	6,000.00	6,000.00
Great Britain, France, and Germany, second secretaries, at $2,000 each	6,000.00	6,000.00	6,000.00	6,000.00
Mexico, second secretary	----------	2,000.00	----------	----------
Japan and China, second secretaries, at $1,800 each	3,600.00	3,600.00	3,600.00	3,600.00
China and Turkey, interpreters to legations	6,000.00	6,000.00	4,000.00	6,000.00
Japan, interpreter to legation	2,500.00	2,500.00	2,000.00	2,500.00
Persia, interpreter to the legation and consulate-general	1,000.00	1,000.00	1,000.00	1,000.00
Korea, interpreter to the legation and consulate-general	1,000.00	1,000.00	500.00	1,000.00
Siam, interpreter to the legation and consulate-general	500.00	500.00	500.00	500.00
Spain, clerk hire at the legation	1,200.00	1,200.00	1,200.00	1,200.00
Total, secretaries, interpreters, and clerks	59,850.00	66,675.00	57,675.00	62,475.00
Diplomatic service, miscellaneous.				
Contingent expenses, foreign missions	90,000.00	105,000.00	100,000.00	105,000.00
Loss by exchange, diplomatic service	2,500.00	2,500.00	2,500.00	2,500.00
Steam launch for legation at Constantinople	1,800.00	1,800.00	1,800.00	1,800.00
Rent of buildings for legation in China	3,100.00	3,600.00	3,600.00	3,600.00
Rent of buildings for legation, etc., at Tokyo, Japan	4,000.00	4,000.00	4,000.00	4,000.00
Erection of buildings for legation, court-house and jail, at Tokyo, Japan	----------	25,000.00	----------	----------
Annual expenses of Cape Spartel light	325.00	325.00	325.00	325.00
Bringing home criminals	5,000.00	5,000.00	5,000.00	5,000.00

Comparative statement showing the appropriations for 1894, etc.—Continued.

Object.	Appropriations, 1894.	Estimates, 1895.	House bill, 1895.	Senate committee, 1895.
Diplomatic service, miscellaneous—Cont'd.				
Fees and costs in extradition cases	$5,000.00	$5,000.00	$5,000.00	$5,000.00
Rescuing shipwrecked American seamen	4,500.00	4,500.00	4,500.00	4,500.00
Expenses under the neutrality act	15,000.00	5,000.00	5,000.00	5,000.00
Emergencies in the diplomatic and consular service	60,000.00	40,000.00	40,000.00	40,000,00
Allowance to widows or heirs of diplomatic officers dying abroad	5,000.00	5,000.00	5,000.00	5,000.00
Transporting remains of diplomatic officers, consuls and consular clerks	10,000.00	3,000.00	3,000.00	3,000.00
International Bureau of Weights and Measures	2,270.00	2,270.00	2,270.00	2,270.00
International Bureau for Publication of Customs Tariffs	(*a*)	1,318.76	1,318.76	1,318.76
Continental Railway Commission, printing reports, etc	.....	30,000.00	20,000.00	30,000.00
Commercial Bureau of American Republics	30,000.00	(*b*)	10,000.00	20,000.00
Publication of international catalogue of exports and imports	.....	(*c*)	4,000.00	4,000.00
United States and Chilean Claims Commission	25,000.00	.....	.....	.....
Total, diplomatic service, miscellaneous.	263,495.00	243,313.76	217,313.76	242,313.76
Salaries, consuls-general.				
Havana	6,000.00	6,000.00	6,000.00	6,000.00
London, Paris, and Rio de Janeiro, at $5,000 each	15,000.00	15,000.00	15,000.00	15,000.00
Shanghai and Calcutta, at $5,000 each	10,000.00	10,000.00	10,000.00	10,000.00
Melbourne	4,500.00	4,500.00	4,500.00	4,500.00
Berlin, Montreal, Kanagawa, Panama, Mexico (city), and Honolulu, at $4,000 each	24,000.00	24,000.00	24,000.00	24,000.00
Halifax and Vienna, at $3,500 each	7,000.00	7,000.00	7,000.00	7,000.00
Apia, Constantinople, Dresden, Ecuador (Guayaquil), Frankfort, Ottawa, Rome, St. Petersburg, and St. Gall, at $3,000 each	27,000.00	27,000.00	27,000.00	27,000.00
Singapore, now consul, at $3,000	.....	3,000.00	3,000.00	3,000.00
Nuevo Laredo	2,500.00	2,500.00	2,500.00	2,500.00
Barcelona, now consul, at $1,500	.....	2,500.00	1,500.00	2,500.00
Maracaibo	2,000.00	2,000.00	2,000.00	2,000.00
Tangier	2,000.00	2,000.00	2,000.00	2,500.00
Santo Domingo	1,500.00	1,500.00	1,500.00	1,500.00
Total salaries consuls-general	101,500.00	107,000.00	106,000.00	107,500.00
Consular service, salaries and miscellaneous.				
Consuls, vice-consuls, and commercial agents	395,000.00	382,000.00	390,000.00	391,500.00
Consuls now paid by fees	.....	42,000.00		
Consular clerks	14,600.00	15,000.00	15,000.00	15,000.00
Allowance for clerks at consulates specified	67,600.00	75,450.00	66,850.00	76,250.00
Allowance for clerks at other consulates, to be expended under the direction of the Secretary of State	25,000.00	20,000.00	25,000.00	20,000.00
Interpreters to consulates in China, Korea, and Japan	15,000.00	17,000.00	15,000.00	15,000.00
Interpreters and guards at consulates in Turkish dominions and at Zanzibar	6,000.00	6,000.00	6,000.00	6,000.00
Marshals for consular courts in China, Korea, Japan, and Turkey	9,300.00	10,100.00	9,300.00	9,300.00
Boat and crew for consul at Osaka and Hiogo	500.00	.....	.....	.....
Boat and crew for consul at Hongkong	500.00	.....	.....	.....
Expenses of consular courts	.....	5,000.00	.....	.....
Expenses of prisons for American convicts	14,600.00	15,100.00	14,100.00	14,100.00
Relief and protection of American seamen	50,000.00	50,000.00	50,000.00	50,000.00
Foreign hospitals at Panama	500.00	500.00	500.00	500.00
Publication of consular and other commercial reports	20,000.00	20,000.00	20,000.00	20,000.00
Loss by exchange, consular service	4,000.00	4,000.00	4,000.00	4,000.00
Contingent expenses, U. S. consulates	150 000.00	200,000.00	150,000.00	180,000.00
Total, consular service	772,600.00	862,150.00	765,750.00	801,650.00
Grand total, diplomatic and consular service	1,557,445.00	1,642,638.76	1,509,738.76	1,579,438.76
Supplemental estimates	.....	30,000.00	.....	.....
Total	1,557,445.00	1,672,638.76	1,509,738.76	1,580,438.76

a Appropriation of $1,318.76 in sundry civil act of March 3, 1893.
b Supplemental estimate of $26,000 for this purpose.
c Supplemental estimate of $4,000 for this purpose.

APPENDIX.

LETTER OF THE ACTING SECRETARY OF STATE.

DEPARTMENT OF STATE,
Washington, May 12, 1894.

GENTLEMEN: In response to a letter from the clerk of the Committee on Appropriations of the 2d instant, I have the honor to invite your attention to certain features of the diplomatic and consular bill (H. R. 6108) making appropriations for that service for the fiscal year ending June 30, 1895, which do not agree with the Department's estimates, and which, in view of the public interests, in my judgment, should be modified before the bill is enacted into law.

SECRETARY OF LEGATION TO KOREA.

The Department asked for an additional appropriation of $500 for secretary of legation to Korea. The reason for this small increase was given in the letter of the Secretary of State to the Secretary of the Treasury of October 23, 1893, and the recommendation was influenced largely by the fact that the traveling expenses to reach and the living expenses at the post are very great. Under these circumstances I am constrained to urge this small increase of salary.

SECRETARY OF LEGATION AT MANAGUA.

An estimate was likewise submitted for a "secretary of legation to Nicaragua, Costa Rica, and Salvador." Upon this subject I invite attention to the recommendations in the same letter, in which the reasons, based upon the Department's past experiences, were stated in recommending this item of $2,000, which would only place the mission at Managua upon the same footing as that at Guatemala City. I submit that the public interests require this additional assistance, both on account of the volume of work at the legation, and in order that the valuable archives thereof may be placed in charge of a responsible head during the enforced temporary absence of the minister in either of the two other countries, Costa Rica and Salvador, to which he is also accredited.

SECOND SECRETARY OF LEGATION TO MEXICO.

A second secretary of legation to Mexico, at $2,000, was recommended in the estimates, and the Department's reasons for including this item are explained in the letter, to which I beg leave to refer. The mission to Mexico is now of the first grade, and the constantly increasing volume of the work there suggests the propriety of providing the minister with this additional assistance.

INTERPRETERS AT PEKING AND CONSTANTINOPLE.

It is observed that the proposed bill, under the item of "Interpreters to legations to China and Turkey," provides a salary at $2,000 each. The estimates request $3,000 each, the amount heretofore annually appropriated for those officers. The lesser sum is inadequate as a just compensation for a person competent to discharge such important and delicate functions, and I urgently recommend that the original amount of $3,000 be retained for each. Mr. Fleming D. Cheshire, the interpreter at Peking, is one of the most valuable men in the service. He is an American citizen, appointed in 1884, and the minister at Peking must necessarily depend upon him, not only for accurate translations, but in the conduct of his current official duties with the Chinese foreign office. Indeed, a competent interpreter is absolutely essential to a proper discharge of those duties in China.

Much of what I have stated in regard to the interpreter to China is applicable to the like officer to Turkey. Mr. Gargiulo, the interpreter at Constantinople, is not an American citizen, but has been in the service since 1873. He is thoroughly capable and reliable, and it is doubtful that his place could be supplied by one of our own citizens in Turkey, of which country he is a native. The mission to Constantinople is one of importance, and many questions are constantly arising which require the most delicate treatment. It follows that the minister should have the best possible assistance, since he is compelled to depend largely upon his interpreter for a proper and faithful discharge of all official duties.

INTERPRETER AT TOKYO.

Another serious mistake, should it be enacted into law, is the reduction of the salary of interpreter to the legation to Japan, as is proposed in the bill under consideration. It provides a salary of only $2,000, which is less by $500 than that at present and heretofore appropriated. Mr. Willis N. Whitney, the interpreter, is a native of the United States. He was appointed to his present position in 1883. He is a competent and faithful officer. He is regarded as the equal of any of the Japanese in the knowledge of their language, and has contributed to its literature in the form of text-books and dictionaries, which have a standard value. His services are of great value to the United States and he is clearly entitled to the $2,500 salary now paid to him. I trust that it will be restored to that amount.

SALARIES OF CONSULS.

In the debate in the House of Representatives upon this bill certain erroneous declarations as to the law regulating consular fees and allowances were made, and, being permitted to pass unchallenged, may have had some influence upon the bill. I desire to call the attention of the committee to two important subjects discussed:

(1) In the debate on the 25th ultimo (Congressional Record, p. 4954, first column) Mr. Baker, of New Hampshire, stated, citing as his authority the case of Mosby *v.* The United States, 24 Court of Claims, that consuls retained as unofficial fees all fees collected for certifying invoices of goods not subject to duty. This statement was taken up and urged throughout the day's debate against the recommendations of the bill as to the salaries of certain consuls. The answer to this contention is found in the reversal of Mosby's case by the Supreme Court of the United States. (133 U. S., pp. 273–288.) It was held by the Supreme Court that the fees for consular certificates to invoices of goods on the free list were official and the property of the Government. Consuls do not withhold from the Treasury fees for certifying invoices of goods imported into the United States, whether subject to duty or free of duty. Section 4 of the customs administrative act of June 10, 1890 (R. S. Supp., p. 745), requires "That except in case of personal effects accompanying the passenger, no importation of any merchandise exceeding one hundred dollars in dutiable value shall be admitted to entry without the production of a duly certified invoice thereof as required by law."

It was urged by certain members in this debate that the salary of a consul should be regulated by the amount of fees paid by him into the Treasury. This contention ignores the fact that many of the most important duties of a consul are performed without cost to the recipient for the service rendered. The logical result of such a conception of the consul's duty would be the closing of all offices except those at which invoices are certified and the conversion of a consul into a mere Treasury agent to prevent frauds upon the revenue. By enlarging the fees for official services, and by prescribing fees for services which are now rendered gratuitously, the executive department could double the income from consulates, and upon this basis of estimates, justify larger salaries; but such a course, it is apparent, would tend to the weakening of the consular service and be inimical to the true interests of the country. The usefulness of a consul to the American public is not solely tested by the fees which he collects, and his compensation should not be regulated by that consideration alone.

(2) Salaries recommended by the Committee on Foreign Affairs for feed consulates which turn into the Treasury a large surplus of fees, were rejected by the House (on points of order). In the debate the point was made and repeated that a feed consul was entitled to retain out of the official fees collected by him, $2,500 a year and no more, whereas the granting of a salary carried an allowance for rent, for clerk hire, and for messenger hire. This assumption is erroneous. Section 1732 of the Revised Statutes provides that, "Whenever the fees collected by or in behalf of any consul or commercial agent not mentioned in Schedule B or C, amounts to more than twenty-five hundred dollars in any one year, *over and above such expenses of office rent and clerk hire as are approved by the Secretary of State*, of which return shall be made to the Secretary of the Treasury, the excess for that year shall be held subject to the draft or other directions of the Secretary of the Treasury."

Feed consulates doing a business which amounts in fees to from $3,000 to $6,000 a year are permitted to pay office rent out of the fees and are granted an allowance (not exceeding $500 a year) for clerk hire. The allowances which usually go with salary do not exceed those which are made under the law to feed consuls who collect fees above their compensation sufficient to pay the allowances.

The attention of the committee is invited to what is said on page 299 of the estimates in regard to the consulates at Cape Town and Hull. In the bill as reported by the Foreign Affairs Committee, these offices were provided with salaries at $2,000

a year. In the bill as passed by the House, the consul at Cape Town is given a salary of $1,500 and Hull is stricken out. I beg that your committee will reconsider the action of the House of Representatives in this respect, and provide compensation at these two specially important posts that will secure and remunerate faithful and efficient service.

CLERK HIRE AT CONSULATES.

In the estimates upon which the bill just passed by the House is based, the Secretary of State asked for specific allowances for clerk hire at the following places, not heretofore specially provided for, but which had been supplied with clerks out of the general allowance for clerk hire placed at the disposal of the Secretary of State:

Rome	$1,000.00	Nottingham	$600.00
St. Petersburg	800.00	Odessa	600.00
Cairo	600.00	Para	600.00
Cologne	600.00	Pernambuco	600.00
Constantinople	600.00	Tampico	600.00
Huddersfield	600.00	Vera Cruz	600.00
Mayence	600.00		
Munich	600.00	Total	9,000.00

Four hundred dollars additional for clerk hire at the consulate at Sonneberg was advised. On the other hand a reduction by $5,000 was recommended in the general supplementary allowance, making a total of $20,000 instead of $25,000, as heretofore appropriated. This action was suggested because, first, the consulates named for specific allowances absolutely require clerk hire in sums larger than can be paid out of the general fund; and, second, upon the belief that where regular allowances are necessary they should be made by Congress, leaving the fund for general distribution by the Secretary of State to be placed where, in each year, it seems to be most expedient to use it. The Committee on Foreign Affairs of the House reported a bill ignoring the recommendations for specific appropriation and providing only $20,000 for distribution by the Secretary of State, thereby reducing the total amount of the appropriation $5,000 as compared with that of last year and making the aggregate $14,400 less than the amount requested in the estimates. By amendment, however, in the House the amount for distribution by the Secretary of State was made $25,000, but the specific appropriations were left as reported and precisely as they were in the act of last year, so that the bill as it now stands appropriates the same amount heretofore provided, although several consulates have been added and the salaries at quite a number have been increased.

It is suggested in this connection also that the general activity of the service will undoubtedly be very much stimulated by the prospective reduction of the tariff on imports and the corresponding increase in international trade. I may also add that the clerical work at the consulates has been largely increased, and may refer particularly to the correspondence with citizens of the United States, who make inquiries in regard to foreign markets and other matters pertaining to commercial interests. The correspondence of this character alone has increased, I may safely say, 30 per cent in the last eighteen months.

These facts are submitted to the consideration of your committee in the hope that you may review the estimates for clerk hire, which did not receive the favorable consideration of the Committee on Foreign Affairs in the House of Representatives.

CONTINGENT EXPENSES, U. S. CONSULATES.

Two hundred thousand dollars was requested for this purpose (see Estimates, p. 96) for reasons which are stated on page 300 of the Estimates. This amount is an increase of $50,000 beyond the former appropriation. The reason for asking it is that the appropriation may be sufficient to cover the necessary inevitable expenses for the nineteen items of expenditure provided for under this head. If found in excess of the actual needs of the service the surplus will revert to the Treasury. In the fiscal year 1885–'86, when the appropriation was $150,000, the expenditure was in round numbers $190,000.

1886–'87	$147,435.98
1887–'88	153,801.06
1888–'89	164,824.58
1889–'90	187,971.57
1890–'91	228,693.99
1891–'92	228,589.50
1892–'93	191,817.43

The items of expenditure in the year 1893 are as follows:

Rent	$85,574.38	
Postage	27,918.41	
Stationery	33,406.04	
Newspapers	2,108.19	
Furniture	3,819.32	
Traveling expenses	2,542.16	
Fuel and lights	3,823.16	
Telephone	1,100.18	
Messengers	9,804.20	
Telegrams		
Statistics		
Freight		
Seals		21,721.39
Presses		
Flags		
Boats		
Chinese writers		
Total		191,817.43

The total amount of expenditures under this head for the current fiscal year will be less than $191,000, but more than $150,000. By as searching inquiry as could be made without inspection the total allowance for office rent has been reduced about $5,000 a year; the allowance for newspapers has been greatly reduced; practically nothing has been expended for furniture; consuls-general have not been permitted to visit their subordinates, nor consuls their agencies, at the expense of the Government; messenger service has been withdrawn, except at a few seaports where the execution of the quarantine regulations required their employment, and as rigid economy as possible has been maintained in respect of the other items enumerated in this clause of the bill.

The policy pursued this year can not be followed in all respects year after year without injury to the service. The consular office furniture is annually deteriorating, and a reasonable expenditure every year for repairs and for replenishing is in my opinion the exercise of true economy. The omission of outlay for this object in one year must be made good the next. A considerable expenditure for furniture must be made next year unless the policy of requiring consuls to furnish their offices at their own expense be adopted.

The item of postage on official communications is large, and it is hoped that it may be reduced by careful scrutiny of the accounts and the disallowance of all charges not strictly within the provision. This item can not be arbitrarily reduced, however. Inquiries from our citizens pour in upon consuls and must be answered. There is no way of sending return postage with an inquiry addressed to a foreign country. United States stamps can not be used outside of the United States. At the present time the correspondence of consuls with citizens of the United States relative to foreign markets and other business interests is unusually active, and it may be expected to increase with the growth of our international trade.

In every office doing considerable business the presence of a messenger is required; otherwise the consul is compelled to neglect his proper duties to do messenger's work. In order that a consul may really earn his salary and perform the duties for which he is appointed, his office should be so equipped that he is not compelled to undertake labor which a boy at $20 a month could do as well.

In the matter of supplies to consulates, there is little room for retrenchment. No consul will request more than he needs, and he must be supplied with all that is necessary. Care is exercised with a view to obtaining the cheapest rates of transportation.

In reply to letters from the chairman of the Committee on Foreign Relations, the Department has made suggestions as to the following posts: Barcelona, Tangier, Para, Algiers, and Cologne, which will no doubt be placed before you.

I have the honor to be, sir, your obedient servant,

EDWIN F. UHL,
Acting Secretary.

Hons. JOSEPH C. S. BLACKBURN, CALVIN S. BRICE, and EUGENE HALE,
Subcommittee of the Committee on Appropriations, U. S. Senate.

BELGIUM AND SWITZERLAND MISSIONS.

DEPARTMENT OF STATE,
Washington, June 2, 1894.

MY DEAR SIR: Owing to the accessibility of Brussels, a large number of Americans constantly visit our legation there, to many of whom Mr. Ewing properly feels that he must extend hospitality. His salary, you are aware, is $7,500, which does not enable him to pay house rent and meet other necessary expenses. For this reason I recommend the salary be increased to $10,000.

Very truly yours,

W. Q. GRESHAM.

Hon. J. C. S. BLACKBURN,
U. S. Senate.

DEPARTMENT OF STATE,
Washington, June 4, 1894.

DEAR SIR: I have had an interview with the Secretary of State touching the subject referred to by you in our recent conversation as to the compensation to the ministers to Belgium and Switzerland, and I am authorized by him to say that he concurs with you in the opinion that for the former mission $10,000 and for the latter $7,500 would be a just allowance.

Yours, respectfully,

EDWIN F. UHL,
Assistant Secretary.

Hon. JOSEPH C. S. BLACKBURN,
U. S. Senate.

TANGIER CONSULATE-GENERAL.

DEPARTMENT OF STATE,
Washington, March 27, 1894.

SIR: I have the honor to acknowledge the receipt of your letter of the 25th instant, in which you inquire whether the salary provided for the consul-general at Tangier, Morocco, in the diplomatic and consular appropriation bill now pending in the House of Representatives is commensurate with the duties of that officer.

In reply, I beg to say that the duties of the consul-general at Tangier are largely diplomatic, bringing him into direct personal relations with the minister of foreign affairs. He is to all intents and purposes our minister to Morocco, and nearly all of his colleagues, representing other powers in the same manner that he represents the United States, have the rank and pay of diplomatic officers. Austria, Belgium, England, France, Germany, Italy, Portugal, and Spain are represented by ministers; Denmark and Russia by chargé d'affaires.

Our interests there are not, of course, of the same character as those of European nations, but our representative belongs of necessity to the corps of foreign representatives, and this fact alone in a country like Morocco imposes heavy social and other obligations upon him which can not be ignored without loss of prestige and of official as well as personal influence. The salary provided in the bill—$2,000 a year—is altogether inadequate to the requirements of a position like that of this consul-general. I heartily concur in your suggestion that the salary should be increased at least $1,000 a year, and I hope that your committee will amend the bill accordingly when it reaches the Senate.

I may add that, in addition to his diplomatic duties at Tangier, where the Moroccan foreign minister resides and all international business is transacted, the consul-general at Tangier is charged with the supervision of seven consular agencies through which our commerce with Morocco is carried on. He and the sureties on his official bond are responsible for the fidelity and good conduct of each of these seven commercial subordinates. This responsibility alone, with the labor and care it involves, renders the post an important and difficult one, to say nothing of the superadded diplomatic duties and attendant obligations.

The letter inclosed with yours is herewith returned.

I have the honor to be, sir, your obedient servant,

W. Q. GRESHAM.

Hon. JOHN T. MORGAN,
Chairman Committee on Foreign Relations, U. S. Senate.

BARCELONA CONSULATE.

DEPARTMENT OF STATE,
Washington, March 26, 1894.

SIR: I have to acknowledge the receipt of your letter dated the 21st instant requesting the opinion of this Department upon a proposed amendment to the diplomatic and consular appropriation bill (H. R. 6108) making our consul at Barcelona, Spain, a consul-general and raising his salary from $1,500 to $2,000.

In reply I will refer you to the book of estimates for appropriations for the fiscal year ending June 30, 1895 (Ex. Doc. No. 5, Fifty-third Congress, second session). On page 90 an estimate is submitted for a "consul-general (in lieu of consul) at Barcelona," at a salary of $2,500. On page 300 the reasons for the proposed advance in rank and salary are given. This recommendation was not approved by the Committee on Foreign Affairs in the House of Representatives in their bill (H. R. 6108, p. 17, l. 15), but the estimate was made after due consideration, and it is adhered to. We need a consul-general in Spain; there is a lack of uniformity in the methods of conducting official business in the consular offices in that country which can best be cured by placing them all under the supervision of one officer. Barcelona, being the largest commercial city in Spain and the seat of the ranking consulates of other foreign powers, is regarded as the best place for residence of our supervising officer, although the exports to the United States from Cadiz and from Malaga exceed in value those from Barcelona.

I have the honor to be, sir, your obedient servant,

ALVEY A. ADEE,
Acting Secretary.

Hon. JOHN T. MORGAN,
Chairman of the Committee on Foreign Relations, U. S. Senate.

COLOGNE CONSULATE.

DEPARTMENT OF STATE,
Washington, April 17, 1894.

SIR: I have the honor to acknowledge the receipt of your letter of the 16th instant inclosing for the consideration of this Department a copy of a proposed amendment to the diplomatic and consular appropriation bill (H. R. 6108) by which the salary of our consul at Cologne will be raised to $2,500, and a specific allowance of $600 will be made for clerk hire at that office.

In reply I beg to say that for reasons more fully stated in the inclosed memorandum of facts and statistics the proposed amendment is approved.

The existing conditions at the Cologne consulate are peculiar in the following respects operating in combination.

1. The city is large and expensive to live in. It is in the line of an immense American travel, which passes through, making continual demands upon the consul's time and resources, but being for the most part unconnected with business, leaves little behind in the way of unofficial fees. The consulates at Hamburg, Bremen, Dresden, and Leipsic, where large numbers of our people sojourn for business purposes, derive considerable profit from them in the way of fees for notarial and other unofficial services.

2. The presence of visitors and their demands requires the consul at Cologne to keep up appearances and to make personal expenditures beyond the means provided for him, and beyond the expenditures required for similar purposes at better paid but more remote and unfrequented consulates.

3. Cologne has no consular agency as Bremen, Leipsic, Sonneberg, and Düsseldorf have, from which to show additional compensation ranging from $500 to $1,500 a year. The sole resource for compensation is the salary and the small amount of unofficial fees, never reaching $500, collected in the year.

The clerical work at Cologne is so great that it has been for years past necessary to allow $500 a year for clerk hire out of the general fund provided for consulates not specially provided with clerks. This amount is less than the consul pays, so he has repeatedly informed the Department. A specific appropriation of $600 a year was asked for in the estimates now before your committee (p. 94), and I hope the amount will be included in the bill when it leaves your hands.

I have the honor to be, sir, your obedient servant,

EDWIN F. UHL,
Acting Secretary.

Hon. JOHN T. MORGAN,
Chairman Committee on Foreign Relations, U. S. Senate.

DEPARTMENT OF STATE,
Washington, April 11, 1894.

SIR: Referring to our recent conversation regarding the increase of salary for the consul at Cologne, Germany, I respectfully beg leave to submit the following:

The salary of the consular officers at Aix la Chapelle, Nuremberg, Mayence, Bremen, and Annaberg, all in Germany, is $2,500 each per annum, while that at Cologne is only $2,000.

The official fees collected at Cologne for the fiscal year 1893 amounted to	$5,000
Aix la Chapelle	3,360
Nuremberg	4,700
Mayence	6,200
Annaberg	5,600
Stuttgart	3,206

The official fees collected for the fiscal year 1893, at other consulates in Germany, with salaries of $2,000 per annum, are as follows:

Brunswick	$1,652
Dusseldorf	2,185
Magdeburg	2,239

It will thus be seen that the amount of official fees collected at Cologne is greater than those collected at the majority of the above-mentioned consulates, with salaries of $2,500, in Germany, and almost three times as much as at those places with salaries of $2,000.

The situation of Cologne makes it a great center of travel, and the consul at such a post has considerable outside and unremunerative work to perform for traveling Americans. Besides, it is one of the few most expensive cities in Germany to live in.

I, therefore, submit to the consideration of the committee the proposition to raise the salary at Cologne to $2,500 per year so that it will be on the same basis as those at the above-mentioned consulates.

Only $500 a year is allowed to me for clerk hire out of the appropriation allowed to the department for clerk hire, while I pay my clerk on an average of $700 a year. I employ a messenger at my own expense, which is necessary at a place like Cologne, at $240 per year.

I hereby make application for the allowance of the $240 a year I expend for messenger service.

I have the honor to be, sir, your obedient servant,

WILLIAM D. WAMER,
U. S. Consul.

Hon. EDWIN F. UHL,
Assistant Secretary of State, Washington, D. C.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 472.

IN THE SENATE OF THE UNITED STATES.

JUNE 9, 1894.—Ordered to be printed.

Mr. GALLINGER, from the Committee on the District of Columbia, submitted the following

REPORT:

[To accompany S. 1841.]

The Committee on the District of Columbia, to whom was referred the bill (S. 1841) to provide that all persons employing female help in stores, shops, offices, or manufactories shall provide seats for the same when not actively employed, have considered the same and report:

This bill has received the indorsement of the District Commissioners and of the Woman's Christian Temperance Union of the District of Columbia, as will be seen by the annexed documents:

OFFICE COMMISSIONERS OF THE DISTRICT OF COLUMBIA,
Washington, April 26, 1894.

DEAR SIR: The Commissioners recommend favorable action upon Senate bill 1841, "To provide that all persons employing female help in stores, shops, offices, or manufactories shall provide seats for the same when not actively employed," which was referred to them at your instance for their views thereon.

Very respectfully,

JOHN W. ROSS,
President Board of Commissioners, District of Columbia.

Senator ISHAM G. HARRIS,
Chairman Committee on the District of Columbia, U. S. Senate.

To the honorable the Senate and House of Representatives of the United States in Congress assembled:

The Woman's Christian Temperance Union of the District of Columbia, at an executive meeting, voted to indorse, and do hereby indorse, through the signatures of its general officers, Senate bill No. 1841. Said bill was introduced by Mr. McMillan and provides for the seating of female help in offices, stores, etc., when such help are not actively employed.

MRS. MARY E. GRIFFITH,
President.
MRS. EMMA F. SHELTON,
Recording Secretary, 1918 Fifteenth Street.
MRS. S. M. HARTSOCK,
Corresponding Secretary, 414 Tenth Street SW.
MRS. S. M. WESCOTT,
Treasurer, 918 Twenty-third Street NW.
MISS L. C. KESSLER,
Auditor, 802 I Street NW

Inquiry reveals the fact that there are practically no seats provided for the help (often overworked) in the stores of the city of Washington, and hence this legislation seems necessary and proper. Many of the States have similar laws, and they are working satisfactorily so far as can be learned.

Your committee are of opinion that the bill should become a law, and therefore report it back favorably and recommend its passage.

○

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 476.

IN THE SENATE OF THE UNITED STATES.

JUNE 12, 1894.—Ordered to be printed.

Mr. VILAS, from the Committee on Post-Offices and Post-Roads, submitted the following

REPORT:

[To accompany S. 2065.]

The Committee on Post-Offices and Post-Roads, to whom was referred the bill (S. 2065) to prevent the carrying of obscene literature and articles designed for indecent and immoral use from one State or Territory into another State or Territory, having given the same consideration, respectfully report:

The bill should be amended by striking out the word "five," in the twenty-sixth line and inserting "one" and by striking out the words "five years" in the twenty-seventh line and inserting "one year," and as so amended your committee recommend that the bill pass.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 478.

IN THE SENATE OF THE UNITED STATES.

JUNE 15, 1894.—Ordered to be printed.

Mr. CAFFERY, from the Committee on Claims, submitted the following

REPORT:

[To accompany S. 1881.]

The Committee on Claims, to whom was referred the bill (S. 1881) for the relief of Edward H. Murrell, respectfully report the same and recommend its passage.

The bill provides for the payment to Edward H. Murrell, a citizen of Virginia, the sum of $1,409.34, and was referred to the Secretary of the Treasury for information as to the items of account. Hon. W. E. Curtis, Acting Secretary of the Treasury, replied in a letter dated May 5, 1894, in which he says that the records of the Treasury show that B. F. Flanders, supervising special agent at New Orleans, under acts of Congress of March 12, 1863, and July 2, 1864, and the rules of the Treasury, seized certain premises there as abandoned property, of which Edward H. Murrell was the reputed owner, and that as appears by his account he received as rent for the premises and turned over to the Treasury Department as follows:

From No. 106 Poydras street	$293.00
From No. 112 Poydras street	578.61
From No. 31 Natchez street	537.73
Total	1,409.34

The Acting Secretary of the Treasury states that under the third section of the act of March 12, 1863, claimants had until two years after the close of the rebellion, to wit, until August 20, 1868, the right to file their claims in the Court of Claims, and as they did not do this, Congress must be the judge as to whether they should now be paid and upon what condition.

Mr. Murrell explains in his petition that he had obtained the papers upon which to base his claim, and that his overcoat containing them was stolen. There can be no doubt that this money was collected and turned into the Treasury, and it seems just and right that it should be restored.

Gen. Benj. F. Butler, to whom the city of New Orleans was surrendered, pledged the Government to the protection of private property, and the Supreme Court of the United States in the case of Planters' National Bank *v.* Union Bank, 16 Wall., 483, has decided that this pledge binds the Government. Furthermore, it appears that Mr. Murrell, who was a citizen of Virginia, was pardoned by President Johnson for any participation in the rebellion.

The letter of Acting Secretary Curtis is hereunto attached marked Appendix A, with the petition of E. H. Murrell marked Appendix B.

APPENDIX A.

TREASURY DEPARTMENT, OFFICE OF THE SECRETARY,
Washington, D. C. May 5, 1894.

SIR: I have the honor to acknowledge the receipt of your letter of the 2d instant inclosing Senate bill No. 1881, for the relief of Edward H. Murrell, and you ask, in effect, if the Treasury records are in accord with the facts as stated in the bill.

In reply, you are informed that the records show that B. F. Flanders, supervising special agent of the Treasury Department, at New Orleans, under the provisions of the act of March 12, 1863 (12 Stat., 820), and the act of July 2, 1864 (13 Stat., 375), and pursuant to the rules and regulations of the Secretary of the Treasury, approved by the President, seized certain premises as abandoned property, in New Orleans, of which Edward H. Murrell was the reputed owner, and that the said B. F. Flanders, as appears by his account rendered, received as rent from the premises and turned over to the Treasury Department, as follows:

From No. 106 Poydras street	$293.00
From No. 112 Poydras street	578.61
From No. 31 Natches street	537.73
Total	1,409.34

Also, that no rents were derived from these premises prior to December, 1864, and none after June, 1865, and that under instructions Mr. Flanders, July 1, 1865, turned over this property to the bureau of refugees, freedmen, and abandoned lands and received an official receipt therefor.

The records of the Department disclose the fact that a large number of similar claims might be presented, and it would seem, therefore, that if they are to be paid a uniform mode of settlement should be provided.

I will state further, that under the third section of the act of March 12, 1863 (12 Stat., 820), these claimants had until two years after the close of the rebellion—to wit, until August 20, 1868—the right to file their claims in the Court of Claims. As they did not do this Congress must be the judge as to whether they should now be paid, and upon what conditions.

Respectfully, yours,

W. E. CURTIS,
Acting Secretary.

Hon. D. CAFFERY,
Committee on Claims, U. S. Senate.

APPENDIX B.

To the Congress of the United States:

Your petitioner respectfully represents that in 1861 and for many years afterwards he was the owner of the following houses in New Orleans, La., to wit: No. 106 Poydras street, No. 112 Poydras street, and No. 31 Natchez street. The rents of those houses were sequestrated by the agents of the United States and their rents, amounting to $1,400.34, were turned into the Treasury, according to the accounts of B. F. Flanders, a Treasury agent. These rents were derived from December, 1864, to July, 1865. The city of New Orleans was taken possession of by the military forces of the United States under proclamation of the commanding general, promising protection to property, which has been held by the Supreme Court to be binding.

Your petitioner, who resided then, as now, in Lynchburg, Va., was pardoned by President Johnson for sympathy for the Confederate cause during the war, in which cause he took no further part than as a citizen of Virginia to give his adhesion to the *de facto* condition of things. In point of fact, your petitioner's property was sequestrated to a much larger extent than is indicated by these items, and he had prepared at one time to substantiate his claim to this and other items, but his overcoat containing the papers was stolen, and he was without the evidence upon which to sustain his claim. It is indisputable that the items aforesaid were collected and received by the United States and turned into the Treasury, and he respectfully asks that they may be restored and paid to him.

Very respectfully,

E. H. MURRELL.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 479.

IN THE SENATE OF THE UNITED STATES.

JUNE 15, 1894.—Ordered to be printed.

Mr. MCMILLAN, from the Committee on the District of Columbia, submitted the following

REPORT:

[To accompany H. R. 6171.]

The Committee on the District of Columbia, to whom was referred the bill (H. R. 6171) to authorize the Metropolitan Railroad Company to change its motive power for the propulsion of the cars of the said company, report the measure with certain amendments, and recommend that the bill as so amended do pass.

Before any further rights or privileges are granted to the Metropolitan Company, the committee are of the opinion that the company should at once improve its rolling stock. It is not necessary to call the attention of the Senate to the fact that almost all the closed cars used by the company are not only old and of an antiquated pattern, but they are also dirty and ill-smelling. The front platforms are encumbered with blankets, pails, and sand boxes; and altogether the cars present a poverty-stricken and even a niggardly appearance, disgraceful alike to the city which has to endure them and the company which provides them. Inasmuch as it seems best to permit the use of horses on the east and west lines until the new motive power has been tried on the north and south lines, the first amendment to the bill provides that new cars shall be placed on the east and west lines within ninety days from the passage of the act, and imposes a penalty of $25 for each and every day of neglect or failure on the part of the company.

When in 1890 Congress provided that the Washington and Georgetown and the Metropolitan Railroad companies should find some motive power other than horses within two years, on penalty of forfeiting their charters, the first-named company set about putting a cable on their lines, and within the time specified completed the change to a mechanical motor. The problem for that road was a comparatively simple one. Years of careful and judicious management, together with a route on the principal thoroughfares of Washington and Georgetown, had made the company a prosperous and wealthy corporation. According to every theory of street railroading, both the commercial and the physical features called for a cable road. With the Metropolitan road the case was different. Experienced cable engineers advised that the curves were too many and too sharp to permit the successful use of a cable, and the fact that for considerable distances the road runs through residence streets makes the use of a cable on that line inju-

dicious, provided any other method of mechanical propulsion can be found.

Four years ago there were two mechanical motors in the field—the overhead trolley and the storage battery. Of these the overhead trolley had been and to this day has been refused access to the city of Washington, save for a short distance on New York avenue, where it is tolerated for a fixed time. Forced as a last resort to select the storage-battery motor, the Metropolitan Company made a faithful and expensive effort to equip its lines with storage battery-cars. A power house was built and equipped, at a cost of $385,000; 40 cars were made ready for the storage batteries, and several storage-battery cars were placed on the road. The result was a complete failure. The same obstacles which have been found insuperable in every other attempt to store electricity for use as motive power also appeared in this case; and the attempt had to be abandoned.

In the meantime, attention had been called to the underground systems of electrical propulsion; and, in case the bill now under consideration shall become a law, the Metropolitan company proposes to try the experiment in this country of the Budapest system, which for several years has been in successful operation in the Hungarian capital. This system has been examined in Budapest by one of the Commissioners of the District of Columbia, by one of the editors of the Washington Star, and by one of the members of this committee, and the only question which has arisen in regard to its success when transferred to this city relates to the width of the slot necessary to connect the car with the underground wire. The extreme width of vehicle tires in Hungary permits a wide slot and advantage is taken of this fact to make the opening wide enough to allow the conduit to be swept with brooms handled by men. A device, however, is in operation on cable roads by which the conduits are cleaned by machinery, and there is no reason why the slot for underground electrical work should be wider than that of cable roads. The objection, therefore, may be dismissed.

Moreover, the same company which put down the Budapest road stands ready to do a like work in Washington and to guarantee its success. The representative in the United States of this company also constructs cable roads and is quite responsible, The committee, however, preferring to advise no unnecessary risks, have decided to recommend that, in case some unforeseen contingency which should bring about entire or partial failure, the company shall have the right to utilize the underground construction for cable purposes.

Again, the north and south line, from the river to Florida avenue, should first be equipped in order to ascertain beyond question that the system about to be introduced is a practical one. If it is, then the company should put it into operation on its east and west lines within two years from the date of the passage of the act. If it is not, then Congress can make further provision.

If these provisions shall seem to involve considerable delay, it may be said that the District can well afford to wait, if by so doing a satisfactory underground system can be secured; for such a system, when once it is made to work successfully on an important line, will revolutionize street-railway traffic in this and other cities. Moreover, there are certain problems concerning the location and arrangement of tracks which must be examined very carefully when it shall be demonstrated what kinds of motors are practical; and these questions seem to the committee too important to be legislated on without the knowledge which the success or failure of the Budapest system alone can give.

In this matter it should not be forgotten that the Metropolitan Company is made up of no fewer than 253 stockholders, all but 4 of whom are residents of the District of Columbia. To them success or failure in the coming experiments means a great deal. While the committee is strongly of the opinion that the road in its present condition is giving an unsatisfactory and unworthy service, and that a radical change should be forced upon the company, at the same time they are of the opinion that the present bill will secure this change with a just consideration for the interests of both the District and also the stockholders.

In order to avoid recourse to the tedious and doubtful powers of charter forfeiture as a compelling means of action, the committee has thought it wise to provide against delay and neglect on the part of the company by providing for heavily increased taxation, to be placed on cars operated by horses, after the dates set for the completion of the changes.

The question of the payment of the indebtedness claimed to be due to the District on account of paving done under the former board of public works has been left as the House arranged it, namely, that the whole question shall be referred to the court of appeals of the District of Columbia to determine the matter, without the right of further appeal on either side. This solution is satisfactory to the Commissioners of the District and has been accepted by the company.

Certain unimportant extensions of the company's lines are authorized in the bill, all of which are believed to be in the direction of better service, and to which extensions no objection has been raised.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 480.

IN THE SENATE OF THE UNITED STATES.

JUNE 15, 1894.—Ordered to be printed.

Mr. MITCHELL, of Wisconsin, from the Committee on Military Affairs, submitted the following

REPORT:

[To accompany amendments to H. R. 5575.]

The Committee on Military Affairs has carefully considered the proposed amendments to H. R. 5575 (sundry civil bill), affecting the appropriations for the maintenance of the National Home for Disabled Volunteer Soldiers. The committee reports them back favorably and asks their reference, together with this report, to the Committee on Appropriations

A number of the amendments involve simply a change in phraseology, making more clear the meaning of the act.

Some of the amendments increase the appropriation under certain heads; others decrease it. The House bill carries $2,300,875. The amendments reported by the committee foot up $2,295,623, showing a decrease in favor of the latter of $5,252.

The House bill makes some change in the management of the Home. To this the committee is earnestly opposed. The present system is the result of many years' experience. It works well. Against it there is no good ground for complaint.

From an intimate knowledge of the subject the committee concludes that the present management is economic, business like, and in full sympathy with the unfortunates who seek the shelter of the National Home for Disabled Volunteer Soldiers. The changes contemplated by the House bill would result in administrative complications, delay in adjusting accounts, and increased expense to the Government.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 481.

IN THE SENATE OF THE UNITED STATES.

JUNE 15, 1894.—Ordered to be printed.

Mr. BLACKBURN, from the Committee on Appropriations, submitted the following

REPORT:

[To accompany H. R. 6016.]

The Committee on Appropriations, to whom was referred the bill (H. R. 6016) making appropriations for the service of the Post-Office Department for the fiscal year ending June 30, 1895, report the same to the Senate with amendments, and submit herewith a comparative statement showing the amounts of the estimates for 1895 for the various items for the postal service, the amounts provided by the bill as passed the House of Representatives, the amounts recommended by the committee, and the amounts appropriated for the fiscal year 1894.

POSTAL SERVICE, 1895.

Amount of estimates for 1895	$90,399,485.33
Amount of House bill	87,240,599.55
Reduction recommended by the Senate committee	4,000.00
Amount as reported to the Senate	87,236,599.55
Amount of estimated postal revenues for 1895	84,427,748.44
Amount of post-office appropriation act for 1894	84,004,314.22
The bill as reported is less than estimates	3,162,885.78
The bill as reported exceeds estimated postal revenues	2,808,851.11
The bill as reported exceeds the act for 1894	3,232,285.33

The changes in the amounts appropriated by the bill, as passed the House, recommended by the committee, are as follows, viz:

INCREASE.

For advertising, office of the Postmaster-General	$1,000.00
For payment of rewards for detection, etc., of post-office burglars and robbers	10,000.00
Total increase	11,000.00

REDUCTION.

For advertising for first and second-class post-offices, office of First Assistant-Postmaster-General	15,000.00
Net reduction recommended by committee	4,000.00

Comparative statement showing the appropriations for 1894, the estimates for 1895, the amounts provided by the House bill, and the amounts recommended by the Senate Committee on Appropriations for 1895.

Object.	Appropriations, 1894.	Estimates, 1895.	House bill, 1895.	Senate committee, 1895.
OFFICE OF THE POSTMASTER-GENERAL.				
Advertising	$18,000.00	$18,000.00	$18,000.00	$19,000.00
Miscellaneous items	1,000.00	1,000.00	1,000.00	1,000.00
Total	19,000.00	19,000.00	19,000.00	20,000.00
OFFICE OF THE FIRST ASSISTANT POSTMASTER-GENERAL.				
Compensation to postmasters	15,600,000.00	17,250,000.00	16,000,000.00	16,000,000.00
Compensation to clerks in post-offices	8,810,000.00	9,700,000.00	9,700,000.00	9,700,000.00
Rent, light, and fuel for first and second class offices	802,000.00	845,000.00	845,000.00	845,000.00
Rent, light, and fuel for third-class offices	630,000.00	660,000.00	660,000.00	660,000.00
Miscellaneous and incidental items for first and second class offices, including furniture	125.000.00	140,000.00	140,000.00	140,000.00
Free-delivery service	11,254,900.00	12,327,685.33	12,327,685.33	12,327,685.33
Stationery in post-offices	57,000.00	57,000.00	57,000.00	57,000.00
Wrapping twine	90,000.00	80,000.00	80,000.00	80,000.00
Wrapping paper	60,000.00	50,000.00	50,000.00	50,000.00
Letter balances, scales, and test weights	18,000.00	15,000.00	15,000.00	15,000.00
Postmarking, and rating stamps and ink and pads	40,000.00	30,000.00	30,000.00	30,000.00
Packing boxes, sawdust, paste, and hardware	1,500.00	1,500.00	1,500.00	1,500.00
Printing facing slips, blanks, and books	10,000.00	10,000.00	10,000.00	10,000.00
Advertising at first and second class post-offices	.....	15,000.00	15,000.00	.....
Rental of canceling machines	50,000.00	60,000.00	60,000.00	60,000.00
Total	37,548,400.00	41,241,185.33	39,991,185.33	39,976,185.33
OFFICE OF THE SECOND ASSISTANT POSTMASTER-GENERAL.				
Inland mail transportation by star routes	5,945,000.00	6,000,000.00	6,000,000.00	6,000,000.00
Inland mail transportation by steamboat routes	450,000.00	445,000.00	420,000.00	420,000.00
Mail messenger service	1,275,000,00	1,285,000.00	1,285,000.00	1,285,000.00
Mail bags and mail-bag catchers, and repairs	260,000.00	270,000.00	270,000.00	270,000.00
Mail locks and keys, and repairs	35,000.00	35,000.00	35,000.00	35,000.00
Rent of building for mail-bag repair shop, and fuel, gas, watchman, etc	8,500.00	8,500.00	8,500.00	8,500.00
Inland mail transportation by railroad routes	24,500,000.00	26,900,000.00	25,500,000.00	25,500,000.00
Railway post-office car service	2,941,000.00	3,094,000.00	3,000,000.00	3,000,000.00
Railway post-office clerks	6,894,000.00	7,186,000.00	7,186,000.00	7,186,000.00
Necessary and special facilities on trunk lines	196,614.22	.....	196,614.22	196,614.22
Miscellaneous items	500.00	500.00	500.00	500.00
Transportation of foreign mails	1,600,000.00	1,678,000.00	1,400,000.00	1,400,000.00
Balance due foreign countries	110,000.00	152,000.00	110,000.00	110,000.00
Total	44,215,614.22	47,054,000.00	45,411,614.22	45,411,614.22
OFFICE OF THE THIRD ASSISTANT POSTMASTER-GENERAL.				
Manufacture of postage and special-delivery stamps	376,200.00	243,000.00	163,000.00	163,000.00
Pay of agent and assistants and expenses of stamp agency	12,000.00	12,000.00	12,000.00	12,000.00
Manufacture of stamped envelopes, newspaper wrappers, and letter sheets	1,110,000.00	1,160,000.00	1,000,000.00	1,000,000.00
Pay of agent and assistants and expenses of stamped-envelope agency	17,800.00	17,800.00	17,800.00	17,800.00
Manufacture of postal cards	343,700.00	203,000.00	203,000.00	203,000.00
Pay of agent and assistants and expenses of postal-card agency	7,800.00	7,800.00	7,800.00	7,800.00
Registered package, tag, official, and dead-letter envelopes	113,600.00	111,000.00	110,000.00	110,000.00
Ship, steamboat, and way letters	1,500.00	2,000.00	1,500.00	1,500.00
Engraving, printing, and binding drafts and warrants	3,200.00	3,200.00	3,200.00	3,200.00
Miscellaneous items	500.00	500.00	500.00	500.00
Total	1,986,300.00	1,760,300.00	1,518,800.00	1,518,800.00

Comparative statement showing the appropriations for 1894, etc.—Continued.

Object.	Appropriations, 1894.	Estimates, 1895.	House bill, 1895.	Senate committee, 1895.
OFFICE OF THE FOURTH ASSISTANT POSTMASTER-GENERAL.				
Mail depredations and post-office inspectors..	$235,000.00	$300,000.00	$300,000.00	$300,000.00
Payment of rewards for the arrest and conviction of highway, stage, and train robbers, and post-office burglars	.....	25,000.00	.....	10,000.00
Total	235,000.00	325,000.00	300,000.00	310,000.00
Total, postal service.....	84,004,314.22	90,399,485.33	87,240,599.55	87,236,599.55

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 482

IN THE SENATE OF THE UNITED STATES.

JUNE 18, 1894.—Ordered to be printed.

Mr. HAWLEY, from the Committee on Military Affairs, submitted the following

REPORT:

[To accompany S. 1468.]

The Committee on Military Affairs, to whom was referred the bill (S. 1468) for the relief of James L. Townsend, have had the same under consideration and beg leave to report it back to the Senate with a favorable recommendation.

The facts are fully set forth in Senate Report No. 985, Fifty-second Congress, first session, which is hereby adopted and made a part of this report, as follows:

James L. Townsend, of Connecticut, was mustered into service as first lieutenant of Company I, Fourteenth Connecticut Volunteer Infantry, to serve three years, and became captain of said company September 3, 1863. The regiment saw extraordinary service at Antietam, Fredericksburg, Chancellorsville, Gettysburg, Falling Waters, Auburn, Bristoe Station, Blackburn Ford, Mine Run, Wilderness, Laurel Hill, Spottsylvania, Cold Harbor, and many other engagements. According to the testimony of all his comrades he was a good officer, conspicuous for bravery, although strict in discipline, kind and considerate to his men, temperate and exemplary in his habits. He was wounded at Chancellorsville, not severely. Having been in the Seminary Hospital at Georgetown a short time, he was discharged as cured on September 30, 1863. On the morning of October 1 he and a comrade foolishly decided to spend the day in Baltimore, and Townsend intended to start for his regiment in the evening. He dressed in citizen's clothes, purchased a ticket for Baltimore, when a detective (according to official report, although Townsend said that it was a private soldier) asked him if he were a soldier. Townsend replied that he had been. The detective asked him if he had a discharge, and Townsend answered that he had, meaning a discharge from the hospital. The detective told him to go with him to the lieutenant of the guard. Townsend did so, and frankly told the officer the whole story, his rank, regiment, and what he intended to do. The officer told him to start for his regiment, which Townsend did immediately. The regiment was then below Cedar Mountain upon the Rapidan. He reached it October 3.

He was not aware that he was under arrest, for the report on the rolls of the regiment is, "Returned to duty from general hospital October 4." Townsend continued with the regiment in severe campaigning and in the hot battle of Bristoe Station, October 14, 1863. On November 24 (having been "on duty" fifty-two days), he was summoned before a military commission in Washington—not a court-martial—went up there, told his story, went back to duty within a day or two, and served with his regiment until January 12, 1864, when he went to Washington on sick leave, and there received an order stating that he had been dismissed from the service on December 2, 1863, "for absence without leave, after discharge from hospital, and attempting to leave the city of Washington and go north in citizens' clothes, but denying at the time that he was an officer."

Townsend certainly did not try to go north further than Baltimore. He did attempt to be absent without leave during that day. He was in Washington for

the purpose of going to his regiment and ought to have started immediately, and did start after being checked at the depot. If he were absent without leave it was a mere technical absence for an hour or two. He did mislead the detective, but frankly told the lieutenant of the guard the true story, went off to duty and honorably served in battle. More than three and a half months after his return to his regiment, during which period he was at no time under arrest, he was given a copy of the order of the military commission dismissing him from the service on December 2, 1863.

He did not intend a serious offense, and he was only technically guilty of any. No witnesses as to Townsend's character or reputation as an officer were before the commission, and the whole regiment would have borne the highest testimony to his good character. But as far as the committee can learn from the testimony and the records in the case, Townsend was an honorable and trustworthy man, and he has borne this reputation since.

Immediately after the dismissal of Townsend the Hon. Augustus Brandgee, a member of the House of Representatives from Connecticut, submitted to the War Department a petition signed by all the commissioned officers of the Fourteenth Connecticut Volunteers requesting the restoration of Capt. Townsend to his former rank and position.

This petition, together with all papers in the case, were referred to Brig. Gen. Joseph Holt, Judge-Advocate-General of the Army, for review and report, and under date of January 28, 1864, the papers were returned by that officer to the Secretary of War, with the following statement:

* * * "The case is not complicated. The facts are conceded. Capt. Townsend having just been discharged from the Seminary Hospital in Georgetown on the 30th of September tried to pass the guard at the depot in citizen's clothes, intending, as he says, to go to Baltimore and return the same day. He was arrested by a detective, ordered before the board, of which Gen. Rickets is president, tried, and no satisfactory defense being made, dismissed by order.

"It is proper to remark that the petition signed by his brother officers represents Capt. Townsend in an exceedingly favorable light as an officer and a gentleman. It would not be easy to frame a stronger testimonial in behalf of military character and services than is presented in the very flattering encomiums bestowed by the signers upon this officer. They say that 'he has been *from the first a most faithful officer, always on duty, conspicuous for bravery* on the battlefield, *careful* for his *men, temperate* in his habits, *strict* in *discipline, beloved* by his brother *officers*, and almost *worshiped* by his men.' And again, 'not one could be selected from the line officers of the regiment whose dismissal would prove of greater detriment to the service so far as the effect upon the spirit of the men and the general good feeling of the regiment are concerned.'

"This highly complimentary testimonial is indorsed 'earnestly recommended' by Col. Charles J. Powers, of the One hundred and eighth New York Volunteers, commanding the brigade, and approved by Gen. Alex. Hays, commanding the division, who states that the petitioners are known to him to be those 'whose representations are worthy of consideration.'

"It may be remarked that it is not charged that this officer intended to desert when he undertook to go to Baltimore. His comrades state that it was a boyish freak, committed without serious thought.

"It devolves upon the Secretary of War to decide whether, in view of the exceedingly fair character which this officer seems to have borne, his attempted evasion of orders and reprehensible conduct in trying to leave the city without a pass, and in a citizen's garb, may be overlooked and his reinstatement ordered."

It is evident from the foregoing report that Gen. Holt, ordinarily a severe disciplinarian, desired that the offense of Townsend should be overlooked, and that he should be reinstated. No action, however, was taken.

Townsend has suffered under the discredit of the dismissal twenty-eight years, and is now broken in health and in the Soldiers' Home. In the meantime he has been one of the most beloved officers among the survivors of his gallant regiment, and those survivors continue to ask that he may be relieved from the mortification and disgrace.

Your committee recommend the passage of the bill.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 483.

IN THE SENATE OF THE UNITED STATES.

JUNE 21, 1894.—Ordered to be printed.

Mr. BATE, from the Committee on Military Affairs, submitted the following

REPORT:

[To accompany H. R. 4961.]

The Committee on Military Affairs, to whom was referred the bill (H. R. 4961) granting certain rights over Lime Point military reservation in the State of California, having considered the same, adopt the report of the House Committee on Military Affairs, which is herewith appended and made a part of this report, and recommend the passage of the bill.

[House Report No. 479, Fifty-third Congress, second session.]

The Committee on Military Affairs, to whom was referred the bill (H. R. 4961), have considered the same, and now report the same with amendments, and as thus amended we recommend the passage of the bill.

This bill grants the right to the citizens of Sausalito, in the State of California, to construct a wagon road over the military reservation at Lime Point, Cal., without cost or expense to the Government, and the War Department approves of such grant, as is shown by report of Gen. Casey, and approved by the Secretary of War, printed herewith.

WAR DEPARTMENT,
Washington, D. C., January 9, 1894.

SIR: I return herewith House bill 4961, Fifty-third Congress, second session, granting certain rights over Lime Point military reservation, California, which was referred to this Department by your letter of the 4th instant, and have the honor to invite your attention to the inclosed report of the Chief of Engineers, dated January 6, 1894, and to the copy of the bill submitted by that officer, with a proposed amendment in line 37, page 2, thereof.

As amended no objection is known to the passage of the bill.

Very respectfully,

JOSEPH B. DOE,
Acting Secretary of War.

The CHAIRMAN OF THE COMMITTEE ON MILITARY AFFAIRS,
House of Representatives.

OFFICE OF THE CHIEF OF ENGINEERS, U. S. ARMY,
Washington, D. C., January 6, 1894.

SIR: I have the honor to return herewith H. R. 4961, Fifty-third Congress, second session, a bill "Granting certain rights over Lime Point military reservation in the State of California," which was referred to the Secretary of War, under date of January 4, 1894, by the House Committee on Military Affairs, with request for the views and recommendations of the War Department concerning the same.

It is recommended that the bill be amended by inserting in the blank after the word "said," in line 37, page 2, the words "citizens of Sausalito."

No objection is known to this office to the passage of the bill amended as recommended.

A copy of the bill so amended is also herewith inclosed.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

Hon. DANIEL S. LAMONT,
Secretary of War.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 484.

IN THE SENATE OF THE UNITED STATES.

JUNE 21, 1894.—Ordered to be printed.

Mr. CAMDEN, from the Committee on Naval Affairs, submitted the following

REPORT:

[To accompany S. 1211.]

Senate bill 1211 is a bill for the relief of Pay Inspector John H. Stevenson, U. S. Navy, and the relief asked for consists in giving him the usual pay of an honorably retired naval officer, instead of half-pay retirement.

The records of the Government show that Mr. Stevenson entered the Pay Corps of the naval service September 19, 1862, having previously served in the volunteer Army. He was in many naval engagements as well as in a number of battles and perilous adventures on land. He was twice promoted by the President of the United States and the Senate "for eminent and conspicuous conduct in battle and extraordinary heroism." He rose regularly in rank until he became a pay inspector, and was ordered in February, 1893, for examination for promotion to pay director. After a prolonged and careful examination by the board before which he appeared, he was unanimously recommended for promotion; but the finding was disapproved and a second board for examination ordered. This second board lasted about ten days, and appears to have been very vigilant and searching in its work. It found and reported Mr. Stevenson in every way qualified for promotion, and so recommended. For reasons which do not appear on record this finding was also disapproved by executive authority, and a third board ordered, which, after going very thoroughly into the case, again found Mr. Stevenson in every way qualified for promotion, and recommended that he be promoted. This finding was also disapproved, for what reason does not appear on record, and is not known by Mr. Stevenson or by the committee.

After a short lapse of time a fourth board was selected, consisting of a line officer, a pay officer, and a surgeon, a very unusual selection, if not entirely without precedent in the history of the Navy. This board found Mr. Stevenson professionally and mentally qualified for promotion, but refused to recommend him for the same on the ground that he was not morally qualified. Upon this finding Mr. Stevenson, under the provisions of law on that subject, was placed upon the retired list at half pay.

The object of the pending bill, as stated above, is to give him the pay of an honorably retired officer, and this we think him fully entitled to.

We are assured, by those who know Mr. Stevenson best, that he is an entirely temperate man, correct in his habits, and honorable in meeting all his obligations. Like all aggressive, active, fighting men, he has made enemies, but he has also made warm and devoted friends.

We submit, herewith, a brief publication of his record as taken from official documents on file in the Navy Department and certified to by Holmes E. Offley, chief clerk, under date of March 28, 1871:

Record of Paymaster John H. Stevenson, U. S. Navy, during the war of the rebellion.

John H. Stevenson was appointed acting assistant paymaster September 19, 1862, attached to the U. S. S. *Satellite,* 1862–'63, and was in the first battle of Fredericksburg (on land) with Hooker's division.

In December, 1862, it was observed, from the deck of the *Satellite,* that the enemy was making signals across the Rappahannock. The commanding officer of the *Satellite* was about to shell the party, but refrained from doing so at the earnest solicitation of Paymaster Stevenson, who stated he would capture the whole party, apparatus, etc., on the succeeding night, which was done as follows: Two boats' crews left the vessel, under command of Paymaster Stevenson, went ashore, captured the party, and broke up the station. While ashore Paymaster Stevenson ascertained that Capt. Charles Lawson, of the Fifty-fifth Virginia (rebel) Cavalry, had opened a recruiting station about 10 or 12 miles back from the river. The party, after anchoring the boats a short distance from shore and leaving two boatkeepers in each, started for the recruiting station. The enemy had cavalry pickets out, but the party got safely through, broke up the station, captured Capt. Lawson, and brought him safely on board the U. S. S. *Satellite,* from whence he was sent to the old Capitol prison at Washington.

The commanding officer of the *Satellite* states as follows:

"To the bravery and energy of Acting Assistant Paymaster Stevenson the success of the expedition was due. Mr. Stevenson frequently volunteered his services for other hazardous duty, and always performed it to my entire satisfaction."

Rear-Admiral Andrew A. Harwood, U. S. Navy, states as follows:

"I perfectly remember your capture of a rebel recruiting officer (Capt. Lawson) while you were attached to the flotilla, then forming part of my command. Your gallant conduct on that occasion, and in frequently volunteering your services for other hazardous duty, was recognized at the time by your immediate commanding officer, whose letter is on record at the Department. Your services on other occasions, and especially at Donaldsonville, eclipse your earlier exploit; it deserves a place, however, on the list of your gratuitous patriotic services."

In June, 1863, the U. S. S. *Princess Royal* was lying off Donaldsonville, La., at the mouth of Bayou La Fourche, for the protection of the town and a small fort called Fort Butler, which was manned by 125 sick and convalescent soldiers. This was the only fortified position then held by the Union forces between Port Hudson and New Orleans. The great importance, *necessity,* indeed, of holding the position was self-evident. The rebel generals, Taylor, Mouton, and Green, with a force, it is believed, of 10,000 men under their command, sent in a demand for the surrender of the fort and town, which demand was refused. They then sent to notify the commandant to have the women and children removed from the place. Paymaster Stevenson, recognizing the great importance of holding the place, and the extreme improbability of the Union forces being able to do so, unless fighting under some great advantage, went as a spy into the enemy's camp, in the rôle of a refugee from New Orleans. In doing so, as he was acting entirely on his own responsibility, he was obliged to run through the Union pickets, and narrowly escaped being shot in so doing. He, however, got safely through, entered the enemy's camp, ascertained where and how the enemy was to make the attack, and returned with the information to Capt. M. B. Woolsey, U. S. Navy, commanding U. S. S. *Princess Royal.* In returning he was obliged to run the enemy's pickets, and again narrowly escaped being shot. The information obtained by Paymaster Stevenson, in conjunction with the heroic bravery of the defending party, was undoubtedly the means of saving the place. The enemy was beaten off after a fierce conflict of four hours, with an acknowledged loss of 1,500 men in killed and wounded.

Knowing just where and when the enemy was to make the attack, the guns of the *Princess Royal* and the fort were loaded with grape and canister, and trained upon the point from whence the advance was to take place. When the attack was made (as it was, at the precise time and in the exact direction indicated by Paymaster Stevenson), the enemy was mowed down like grass, and the result, after a bloody and prolonged fight, was a signal victory for the Uuion arms. Capt. M. B. Woolsey states as follows:

"For this information I am indebted to A. A. Paymaster Stevenson, who was out for three days on his own horse, and sometimes on foot, reconnoitering *in* and about the enemy's camp."

On the night of July 9, 1863, the U. S. S. *New London* was sent down the river by Capt. Woolsey, U. S. Navy, senior officer present, with important dispatches for Admiral Farragut, at New Orleans, and orders to force her way through, if possible. In regard to this case, Capt. Woolsey states as follows:

"On the morning of the 10th July (1863), I received a message that the U.S. S. *New London*, which had been sent down the river during the night, with important dispatches for Admiral Farragut, was aground near College Point, some 12 miles below; that she was disabled and under the enemy's fire, and her officers and crew behind the levee. I sent to the telegraph station, but found that the wires had been cut; then before going down to the assistance of the *New London*, I landed A. A. Paymaster Stevenson, with orders to go down behind the levee to the *New London*, get the dispatches from Lieut. Commander Perkins, fasten a bit of lead around them, and if possible, to proceed down to New Orleans with them, to seize horses as he wanted them, and to dash through the enemy's pickets and suspicious places with all speed, but, if surrounded by the enemy, to pitch the dispatches into the river. The cheerfulness with which Mr. Stevenson *volunteered* to perform this hazardous duty, and the energetic and successful manner in which he performed it, would certainly have been noticed by the Government had my report in which the circumstances were stated been received. The distance performed by A. A. Paymaster Stevenson was 85 miles, and through the enemy's country.

Admiral D. G. Farragut, U. S. Navy, also testifies as follows:

"I distinctly remember that this officer was very active and energetic in conveying dispatches on the Mississippi River in 1863, and I therefore cheerfully indorse his conduct during that period (as set forth by his commanding officer), and consider him well entitled to Government recognition."

Admiral David D. Porter testifies:

"Gen. Sherman had not heard of the capture of Fort Fisher, and I supposed he might march down on Fort Fisher and leave the main road when he ought to connect with Gen. Grant's army. I called for volunteers to carry dispatches through the enemy's country. Mr. Stevenson volunteered and carried the dispatches safely to Gen. Sherman, through the enemy's country at the risk of his neck; for, had they caught him they would have hung him."

He was, also, in all the battles and skirmishes on the Potomac and Rappahannock rivers, from November, 1862, to April, 1863; on the Mississippi River, from June, 1863, to September, 1863; all the fights on the James River during the last year of the war, and at the capture of Petersburg and Richmond.

NAVY DEPARTMENT, *March 28, 1871.*

The extracts cited in the foregoing statements of Paymaster Stevenson are correct, as shown by comparison with the official documents on file in this Department.

HOLMES E. OFFLEY,
Chief Clerk.

In June, 1870, the President of the United States, by and with the advice and consent of the Senate, advanced Paymaster John H. Stevenson fifteen numbers in his grade, "for extraordinary heroism."

Not deeming him sufficiently rewarded for all his services, the President of the United States, by and with the advice and consent of the Senate, on April 30, 1879, again advanced Paymaster John H. Stevenson fifteen numbers in his grade, "for gallant and conspicuous conduct in battle, and extraordinary heroism." Paymaster John H. Stevenson was promoted to pay inspector January 18, 1881.

The passage of the bill is respectfully recommended.

O

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 488.

IN THE SENATE OF THE UNITED STATES.

JUNE 21, 1894.—Ordered to be printed.

Mr. PROCTOR, from the Committee on the District of Columbia, submitted the following

REPORT:

[To accompany H. R. 6893.]

The Committee on the District of Columbia, having considered the bill (H. R. 6893) regulating water-main assessments in the District of Columbia, make a favorable report thereon, with certain amendments thereto, and recommend that the bill as amended do pass.

The amendment recommended by the committee strikes out the last proviso, including lines 11 to 19.

This bill, so amended, is identical with bill S. 970, reported favorably in Senate report 264.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 489.

IN THE SENATE OF THE UNITED STATES.

JUNE 26, 1894.—Ordered to be printed.

Mr. HALE, from the Committee on Naval Affairs, submitted the following

REPORT:

[To accompany S. 1438.]

The Committee on Naval Affairs, to whom was referred the bill (S. 2266) for the relief of Louis A. Yorke, have had the same under consideration and beg leave to report it back with an amendment and recommend its passage as amended.

Louis A. Yorke entered the Navy when he was 15½ years old, such entry being in February, 1862. He was commissioned an assistant paymaster in October, 1869, and promoted to be a passed assistant paymaster in 1875. He was ordered before an examining board for promotion to be a paymaster on the 4th of December, 1886, said board consisting of three paymasters, and by this board he was wholly retired from the naval service.

The records of the Navy Department and also the records of the accounting officers of the Treasury Department show that while Mr. Yorke was in the naval service his accounts were always promptly and correctly rendered, and the files of the Navy Department contain letters from his commanding officers extending over a period of twenty years, showing his conduct and record to have been of the highest character. During all the years of his service he was never placed under arrest, suspended, reprimanded, or punished in any way whatsoever, and your committee believes, from its careful investigation into the facts concerning this case, that the action taken by the examination board was arrived at without sufficient evidence, and therefore your committee thinks that this bill should pass and thus in a measure repair the injury done Mr. Yorke.

It should also be stated that Mr. Yorke suffers from a broken leg, which injury he received directly in the line of duty, and as he seeks only to be placed upon the retired list of the Navy with the rank which he attained after twenty-odd years of faithful and meritorious service, your committee is of the unanimous opinion that his prayer should be granted and the bill enacted.

O

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 490.

IN THE SENATE OF THE UNITED STATES.

JUNE 26, 1894.—Ordered to be printed.

Mr. HAWLEY, from the Committee on Military Affairs, submitted the following

REPORT:

[To accompany S. 2070.]

The Committee on Military Affairs, to whom was referred the bill (S. 2070) to provide for the restoration to the State of Michigan two flags carried by the Twenty-second Michigan Infantry Volunteers and now in the War Department, beg leave to submit the following report:

A similar bill was before the committee early in the present session, and was reported adversely on the ground set forth in a letter from the Secretary of War, dated February 8, 1894, in which letter the Secretary quoted the Major-General Commanding the Army as follows:

In my judgment, as a matter of general policy, all flags captured or recaptured by the Army in battle should remain in the custody of the War Department as the property of the United States. As a rule a flag lost by a regiment in battle should, if recovered, not be restored to that regiment unless recaptured by it, or with its very distinguished assistance. If it is restored it should be as a special mark of approval, either of the great gallantry of the regiment, notwithstanding its misfortune at the time the regimental flag was lost, or of very marked subsequent gallantry in assisting to recapture it.

On May 23, 1894, Senator McMillan addressed a letter to Maj. Gen. Schofield, reciting the circumstances under which the regiment lost its flag, in which he said:

While I think there is no one among the Michigan regiments which ever lost a flag under any but the most honorable circumstances, I believe that the Twenty-second Regiment of Infantry was as gallant a regiment as Michigan sent to the front. Its colonel was Moses Wisner, of Pontiac, who stepped down from the governor's chair to enter the Army, and who died at the front.

The flag in question was given to the regiment by the young ladies of Pontiac. It was lost at Chickamauga. On that day the regiment withstood a charge of Longstreet's corps. Lieut. Col. Sanborn was wounded in front of the regiment. The color sergeant, Philo G. Durkee, was shot through the breast and face and fell dead. Corp. Stansell, of the color guard, grasped the colors, but had scarcely raised them when a ball passed through his head, killing him instantly. Corp. Vincent picked up the flag and a moment after was severely wounded. Sergt. Kendall then carried the colors for the rest of the day and went with them into the last charge.

Col. Le Favour had sent word to Gen. Whittaker that his ammunition was exhausted. "You must use your steel," was the reply.

In the twilight, when it was difficult to distinguish friend from foe, the Twenty-second rushed forward—the colonel leading. With fixed bayonets and empty muskets, under a terrific fire of grape and musketry, the charge of the enemy was repulsed. An order was sent by Gen. Steedman to fall back, but it was too late. Before it arrived the regiment was closed in upon by the rebels, on both flanks, and cut off. Of this charge Gen. Steedman says, "It saved that portion of the Army."

The letter, from which the above is an extract, was forwarded to the Committee on Military Affairs by the Acting Secretary of War, with the following indorsement:

Respectfully referred to the Committee on Military Affairs, U. S. Senate, inviting attention to the favorable indorsement of the Major-General Commanding the Army.

This indorsement was as follows:

HEADQUARTERS OF THE ARMY,
Washington, May 28, 1894.

Respectfully submitted to the Secretary of War.

The circumstances, as described by Senator McMillan herein, under which the regimental flag of the Twenty-second Michigan Infantry Volunteers was lost, manifestly bring it within that exceptional class of cases mentioned in my indorsement which the Senator quotes. Hence, in my judgment, the flag may be justly restored to that regiment "as a special mark of the gallantry of the regiment, notwithstanding its misfortune at the time the regimental flag was lost."

J. M. SCHOFIELD,
Major-General Commanding.

In the report of Brig. Gen. Walter C. Whittaker, U. S. Army, commanding First Brigade, First Division Reserve Corps, dated September 28, 1863, p. 863, Vol. XXX, Series 1, Part I, Official Records War of the Rebellion, this regiment is referred to as follows:

The Twenty-second Michigan, Col. Le Favour, after fighting for near three hours, having exhausted their ammunition, boldly charged into the midst of overwhelming numbers with the bayonet, driving them until overcome by superior strength.

The original form of the request was for the return of the flags to the regiment. In the opinion of the committee they should be returned to the State, which may make such disposal of them as it sees fit. This is the present form of the bill, which the committee report back with the recommendation that it do pass.

O

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 495.

IN THE SENATE OF THE UNITED STATES.

JUNE 27, 1894.—Ordered to be printed.

Mr. PEFFER (on behalf of Mr. PALMER), from the Committee on Pensions, submitted the following

REPORT:

[To accompany H. R. 5459.]

The Committee on Pensions, to whom was referred the bill (H. R. 5459) to pension the minor children of Alfred T. Phipps, have examined the same, and report:

The report of the Committee on Invalid Pensions of the House of Representatives hereto appended is adopted, and the passage of the bill is recommended.

HOUSE REPORT.

The Committee on Invalid Pensions have considered the bill (H. R. 5459) to pension the minor children of Alfred Phipps, and submit the following report:

Alfred Phipps served in Company A, Ninth Maryland Infantry, from June 18, 1863, to February 23, 1864, and in Company A, Twelfth Maryland Infantry from July 6, 1864, to November 6, 1864, and also in Company G, Thirteenth Maryland Infantry, from February 17, 1865, to March 29, 1865. He died February 22, 1893, leaving a widow, Eliza J., to whom he was married April 21, 1892, 1 child by this marriage, Ridgely H., and the 5 children named in the bill, by a former marriage. The widow has filed a claim under the general law and under the act of June 27, 1890. The latter claim has been rejected because the widow was not married to the soldier prior to the act of June 27, 1890, as required by that statute. The claim under the general law is pending, but inasmuch as the soldier seems to have died of cancer of the stomach and bowels, and as he never alleged any disabilities due to service, there is no reason to suppose that this claim will ever be allowed.

A claim filed under the act of June 27, 1890, by the guardian of the minor children by the first marriage has been rejected, because the soldier left a widow, who presumably would have prior title, but who, in this instance, has no title under the act of 1890, because of the limitation therein as to date of marriage.

These facts present a very unusual case, and such a one as it is clearly the province of Congress to relieve by special act. These minors by the first marriage are deprived of pension solely by a technicality, wholly unforeseen, growing out of the marriage limitation in the act of 1890.

It is alleged that the stepmother has entirely abandoned these five children, and that they are supported and cared for wholly by an older brother, Joseph Wm. Phipps, who has been duly appointed their guardian. The dates of birth of these children are: John Thomas, born June 15, 1878; Bertha L., September 8, 1882; Mary M., July 26, 1885; Alfred J., January 10, 1887; and Florence H., May 21, 1889, and their pensions under this contemplated act would end respectively in 1894, 1898, 1901, 1903, 1905, the rate being only $2 per month for each child. Even if the widow's claim under the general law should be allowed, no injustice would be done the widow or

the Government by this act, inasmuch as the amount allowed by this bill is only that allowed as "widow's increase for minor children" under the general laws.

Your committee recommend that the bill do pass after being amended by substituting the initial "T." for "P.," after the word John, in line 4; strike out all of line 8, after the word "states," and insert in lieu thereof the words "subject to the limitations and provisions of the act of June 27, 1890, as if no widow had survived." Also, that the title be so amended as to read, "A bill to pension the minor children of Alfred Phipps."

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 496.

IN THE SENATE OF THE UNITED STATES.

JUNE 29, 1894.—Ordered to be printed.

Mr. WASHBURN, from the Committee on Commerce, submitted the following

REPORT:

[To accompany H. R. 7449.]

The Committee on Commerce, to whom was referred the bill (H. R. 7449) authorizing the Minneapolis Gaslight Company, of Minneapolis, Minn., to lay submerged gas pipes across the Mississippi River at Minneapolis, report the same back without amendment, with the recommendation that the bill do pass.

O

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 497.

IN THE SENATE OF THE UNITED STATES.

JULY 2, 1894.—Ordered to be printed.

Mr. MCLAURIN, from the Committee on Claims, submitted the following

REPORT:

[To accompany S. 1992.]

The Committee on Claims, to whom was referred the bill (S. 1992) for the relief of Briscoe B. Bouldin, respectfully report the same with the recommendation that it do pass.

It appears from the papers in this case that Briscoe B. Bouldin, a deputy collector of internal revenue, was badly wounded while in the discharge of public duty, and was subjected by his wounds to the actual expense of $205.15. Of this expense he has presented an itemized account, and his reimbursement is recommended by Hon. Joseph S. Miller, Commissioner of Internal Revenue.

The wounding of Mr. Bouldin occurred in Johnston County, N. C., in May, 1889, while he was engaged in the capture of illicit stills, as is set forth by W. H. Yarborough, collector Fourth district of North Carolina, in a communication which is hereunto appended, marked Appendix A.

The illicit distiller, who was ordered to surrender by Bouldin, fired upon him, the whole charge entering Bouldin's breast and arm and inflicting upon him great injury.

In the letter of Commissioner Miller, which is appended, marked Appendix B, he says:

> On account of wounds thus received Deputy Collector Bouldin was confined to a hospital during the month of May, and subjected to expense for medical attendance, etc., exceeding $200. He rendered an account for the expense incurred, to this office, which account was referred to the First Comptroller, who decided that there was no appropriation from which it could be paid. Mr. Bouldin was a faithful, diligent, and discreet officer, and rendered most valuable service to the Government. In my opinion this claim is meritorious and just, and Mr. Bouldin should be reimbursed for the expense to which he was subjected from the injuries received while in the discharge of his official duty.

Your committee concur in Commissioner Miller's recommendation, and therefore report the bill with recommendation that it pass.

Mr. Bouldin's account is hereto appended, marked Appendix C.

TREASURY DEPARTMENT,
OFFICE COMMISSIONER OF INTERNAL REVENUE,
Washington, D. C., April 18, 1894.

DEAR SIR: An official letter has been mailed to you to-day, stating that the bill for your expenses at the hospital, after being shot in North Carolina in 1890, is not in this office. It is supposed to be upon the files of the First Comptroller. He has been requested to forward a copy of the bill to Senator Daniel, as you request. It is not the custom of this office, and is not considered proper, for the Commissioner to voluntarily recommend special appropriation for reimbursement in a case similar to yours, but his opinion is generally requested by the committee to whom the bill is referred. Your claim being a most meritorious one, I have no doubt whatever that the Commissioner will, if asked, give an opinion favorable to your claim. Perhaps it would not be improper for you to suggest to Senator Daniel, after the bill is presented and referred, to ask for a statement as to the facts in the case from the Commissioner.

Yours, truly,

F. D. LUDALL
Chief of Revenue Agents.

B. B. BOULDIN, Esq.,
Revenue Agent, Danville, Va.

APPENDIX A.

SIR: I have the honor to report the capture of two illicit distilleries and the unfortunate shooting of Deputy Collector B. B. Bouldin.

On Tuesday, May 2, 1889, information was brought to me that two illicit distilleries were being operated in Johnston County near Wake County line.

I immediately sent for A. H. Temple, deputy marshal, and he made a diagram and located said distilleries to his entire satisfaction.

Deputy Collectors Bouldin and Vanderford arrived from Wilmington Friday morning, May 3, 1889, and with Deputy Marshal Temple, started immediately to capture said distilleries. They had no difficulty in finding them. The first one reached, no one was at it, but it was evident that someone had just left, as a coat and dinner were at the distillery.

Deputy Collector Bouldin concluded to stay there and capture the man, Temple and Vanderford going in search of second distillery. They had no difficulty in finding same and destroying it.

While there they heard firing and hurried back and found Bouldin badly shot. Deputy Bouldin stated that "the man soon returned and he arrested him and then commenced the destruction of the distillery; while so engaged the man escaped; after getting through, thinking the man might return, he, Bouldin, laid down behind a log; not long thereafter he saw the same man creeping towards him with his gun in position to fire; he let him get within 30 feet of him and demanded his surrender; immediately thereafter they both fired, then the man fired second barrel, the whole load entering Mr. Bouldin's breast and arm; Bouldin then fired two other shots, all the loads that he had in his pistol, the man running off and making his escape."

Respectfully, yours,

W. H. YARBOROUGH,
Collector, Fourth District, North Carolina.

Hon. J. W. MASON,
Commissioner of Internal Revenue, Washington, D. C.

APPENDIX B.

TREASURY DEPARTMENT,
OFFICE COMMISSIONER OF INTERNAL REVENUE,
Washington, D. C., May 19, 1894.

SIR: Senator Daniel has referred to me Senate bill 1992 for the relief of B. B. Bouldin, and has requested me to give you what information I can respecting the justice of this claim.

In accordance with that request I have the honor to inform you that it appears from the records of this office that B. B. Bouldin was a general deputy collector of

internal revenue, assigned to duty with the revenue agent in North Carolina; that while so assigned and while in the performance of his official duties he was assaulted and seriously wounded by the owner or operator of an illicit distillery which he had seized.

I inclose copy of a letter from W. H. Yarborough, then collector of the Fourth district of North Carolina, in which district the affair occurred, and which fully explains the matter.

On account of the wounds thus received Deputy Collector Bouldin was confined to a hospital during the month of May, and was subjected to expenses for medical attendance, etc., exceeding $200. He rendered an account for the expenses incurred to this office, which account was referred to the First Comptroller, who decided that there was no appropriation from which it could be paid.

Mr. Bouldin was a faithful, diligent, and discreet officer, and rendered most valuable service to the Government. In my opinion this claim is meritorious and just, and Mr. Bouldin should be reimbursed for the expenses to which he was subjected from the injuries received while in the discharge of his official duties.

Respectfully yours,

JOS. S. MILLER,
Commissioner.

Hon. A. J. MCLAURIN,
U. S. Senate, Washington, D. C.

APPENDIX C.

[Voucher No. 1.]

RALEIGH, N. C., *May 31, 1889.*

Mr. B. B. Bouldin, to Dr. James McKee, Dr.

To professional services as follows, viz:

1889.			
May	3.	To night visit, 9 miles distant	$20
	4.	To visit 9 miles and conveying self to St. John's Hospital, involving seven hours	15
	5.	To 2 visits at $2	4
	6.	To 2 visits at $2	4
	7.	To 2 visits at $2	4
	8.	To 2 visits at $2	4
	9.	To 2 visits at $2	4
	10.	To 2 visits at $2	4
	11.	To 2 visits and removing shot	9
	12.	To 2 visits at $2	4
	13.	To 2 visits and removing shot	9
	14.	To 2 visits at $2	4
	16.	To 1 visit	2
	17.	To 1 visit	2
	19.	To 1 visit	2
	22.	To 1 visit	2
	24.	To 1 visit	2
	26.	To 1 visit	2
	29.	To 1 visit	2
	31.	To 1 visit	2
			101

Received payment.

JAMES MCKEE.

[Voucher No. 2.]

RALEIGH, N. C., *May 25, 1889.*

Mr. B. B. Bouldin, Dr., to J. J. L. McCullers, M. D.

To professional services from the evening of May 3 to afternoon of 4 ..... $20

Paid.

J. J. L. MCCULLERS.

[Voucher No. 3.]

Mr. B. B. Bouldin, to St. John's Guild Hospital, Dr.

For board, etc., from May 4 to May 31, 1889, both inclusive, four weeks, at $10 per week	$40.00
Nursing and attendance	13.50
Total	53.50

Received payment.

MAGGIE MCLESTER,
Matron.

[Voucher No. 4.]

RALEIGH, N. C., *June 6, 1889.*

Mr. B. B. Bouldin, bought of Lee, Johnson & Co., druggists and seedsmen.

[Agents for Dr. J. C. Ayer & Co.'s medicines, H. E. Bucklen & Co.'s medicines, and Rubinat-Condal mineral waters; manufacturers of pine and cherry cough sirup; dealers in fancy goods, perfumeries, fine cigars, tobaccoes, etc., corner Fayetteville and Martin streets, opposite post-office. Accounts rendered monthly.]

May	6. Lemons, 15 cents; capsules, 35 cents; (7) witch-hazel, 30 cents	$0.80
	7. Witch-hazel, 30 cents; witch-hazel, $1.85; morphia, 25 cents	2.40
	7. Mixture, 30 cents; (8) witch-hazel, 30 cents; (9) witch-hazel, 80 cents.	1.45
	9. Bottle lithia water, 50 cents; capsules, quinine, etc., 35 cents	.85
	9. Witch-hazel, 30 cents; (10) one-half gallon witch-hazel, 80 cents	1.10
	10. Bottle citrate magnesia, 25 cents; (11) lithia water, 50 cents; (13) witch-hazel, 80 cents	1.55
	16. Witch-hazel, 80 cents; (18) witch-hazel, 80 cents; witch-hazel, 75 cents.	2.35
	21. Witch-hazel, 80 cents; (22) pint whisky and bottle, 60 cents; (24) witch-hazel, 80 cents	2.20
	25. Witch-hazel, 80 cents; (27) witch-hazel, 80 cents; (29) witch-hazel, 80 cents	2.40
June	4. One gallon witch-hazel	1.60
		16.65

Received payment.

LEE, JOHNSON & CO.

RALEIGH, N. C., *May 29, 1889.*

Mr. B. B. Bouldin, to Upchurch & Lancaster, Dr.

[Livery and exchange stables. Carriages, buggies, and horses for hire at all hours of the day or night. Salisbury street, rear new post-office.]

May 29. To spring wagon, May 4, used in transporting Deputy Collector B. B. Bouldin from McCuller's to Raleigh, 9 miles $4

Received payment.

UPCHURCH & LANCASTER.

RALEIGH, N. C., *May 29, 1889.*

Mr. Briscoe B. Bouldin, to Upchurch & Lancaster, Dr.

[Livery and exchange stables. Carriages, buggies, and horses for hire at all hours of the day or night. Salisbury street, rear new post-office.]

May 29. To carriage hire used during night of the 3d to take Dr. McKee and Mr. Vanderford from Raleigh to McCuller's, 9 miles and return, to render medical services to Deputy B. B. Bouldin $5

Received payment.

UPCHURCH & LANCASTER.

RALEIGH, N. C., *May 29, 1889.*

Mr. Briscoe B. Bouldin, to Upchurch & Lancaster, Dr.

[Livery and exchange stables. Carriages, buggies, and horses for hire at all hours of the day or night. Salisbury street, rear new post-office.]

May 29. To carriage, May 4, for Dr. McKee and assistants, 9 miles and return, to render medical and surgical aid $5

Received payment.

UPCHURCH & LANCASTER.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 498.

IN THE SENATE OF THE UNITED STATES.

JULY 6, 1894.—Ordered to be printed.

Mr. GORMAN, from the Committee on Printing, submitted the following

REPORT:

[To accompany H. R. concurrent resolution to print 10,000 extra copies of the Report of the Director of the Mint on the Production of the Precious Metals in the United States for the calendar year 1893; 2,000 for the Senate, 4,000 for the House of Representatives, and 4,000 for the use of the Director of the Mint.]

The Committee on Printing, to whom was referred the accompanying resolution, having considered the same, report it back without amendment, and recommend that it do pass.

The Public Printer estimates the cost at $2,725.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 499.

IN THE SENATE OF THE UNITED STATES.

JULY 6, 1894.—Ordered to be printed.

Mr. GORMAN, from the Committee on Printing, submitted the following

REPORT:

[To accompany House resolution to print 4,000 extra copies of the special report of the select committee of the Medical Society of the District of Columbia on typhoid and malarial fevers and other preventable diseases, 300 for the use of the Senate, 700 for the use of the House, and 3,000 for the use of said society.]

The Committee on Printing, to whom was referred the accompanying House resolution, having considered the same, report it back with an amendment, and as amended recommend that it do pass.

AMENDMENT PROPOSED.

At the end of line 1 insert in parentheses the words "the Senate concurring," so that it may take the form of a concurrent resolution.

The Public Printer estimates the cost at $52.

O

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 500.

IN THE SENATE OF THE UNITED STATES.

JULY 6, 1894.—Ordered to be printed.

Mr. GORMAN, from the Committee on Printing, submitted the following

REPORT:

[To accompany House concurrent resolution to print 35,000 copies of the Report of the Commissioner of Education for 1891 and 1892; 5,000 for the use of the Senate, 10,000 for the use of the House of Representatives, and 20,000 copies for distribution by the Commissioner of Education.]

The Committee on Printing, to whom was referred the accompanying resolution, having considered the same, report it back with the recommendation that it pass.

The cost of printing and binding will be $32,190.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 501.

IN THE SENATE OF THE UNITED STATES.

JULY 6, 1894.—Ordered to be printed.

Mr. CALL, from the Committee on Appropriations, submitted the following

REPORT:

[To accompany H. R. 6937.]

The Committee on Appropriations, to whom was referred the bill (H. R. 6937) making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1895, report the same to the Senate with amendments, and present herewith a comparative statement of the amounts estimated for the several branches of the service under the Department of Agriculture for 1895, the amounts provided by the House bill, the amounts recommended by the committee, and the amounts appropriated for the year 1894.

AGRICULTURAL DEPARTMENT, 1895.

Amount of estimates for 1895	*$2,233,843.06
Amount of House bill	3,215,643.06
Reduction recommended by committee	7,460.00
Amount as reported to the Senate	3,208,183.06
Amount of act for 1894	3,323,500.00

The changes in amounts of House bill recommended by the committee are as follows, viz:

INCREASE.

Division of illustrations and engravings	$1,200.00
Division of seeds	4,720.00
Document and folding room	4,760.00
Total increase	10,680.00

*No estimate was submitted for agricultural experiment stations for which the sum of $700,000 is appropriated in the bill.

REDUCTION.

Secretary's office	$9,440.00
Division of accounts	2,600.00
Division of statistics	500.00
Division of vegetable pathology	700.00
Division of forestry	500.00
Division of records and editing	600.00
Irrigation investigations	2,000.00
Weather Bureau	1,800.00
Total reduction	18,140.00
Net reduction	7,460.00

Comparative statement showing the appropriations for 1894, the estimates for 1895, the amounts provided by the House bill, and the amounts recommended by the Senate Committee on Appropriations, for 1895.

Object.	Appropriations, 1894.	Estimates, 1895.	House bill, 1895.	Senate committee, 1895.
FOR SALARIES.				
Office of the secretary	$81,900.00	$77,500.00	$96,980.00	$87,540.00
Division of accounts and disbursements	17,700.00	17,700.00	15,700.00	13,100.00
Division of statistics	36,100.00	36,100.00	28,260.00	27,760.00
Division of botany	8,600.00	8,600.00	8,600.00	8,600.00
Division of entomology	9,500.00	9,500.00	9,500.00	9,500.00
Division of ornithology and mammalogy	9,860.00	9,860.00	9,860.00	9,860.00
Division of pomology	6,300.00	6,300.00	6,300.00	6,300.00
Division of microscopy	4,700.00	5,300.00	5,300.00	5,300.00
Division of vegetable pathology	5,600.00	5,600.00	6,300.00	5,600.00
Division of chemistry	17,100.00	17,100.00	17,100.00	17,100.00
Division of forestry	7,820.00	8,320.00	8,320.00	7,820.00
Division of records and editing	6,300.00	8,500.00	8,500.00	7,900.00
Division of illustrations and engravings	17,000.00	14,200.00	(*a*)	14,200.00
Division of seeds	13,520.00	9,000.00	9,000.00	13,720.00
Document and folding room	8,460.00	9,000.00	3,600.00	8,360.00
Experimental garden and grounds	2,500.00	2,500.00	2,500.00	2,500.00
Museum	3,840.00	3,840.00	2,400.00	2,400.00
Total salaries	256,800.00	248,920.00	238,220.00	247,560.00
Total number of specific salaries	169	159	115	156
MISCELLANEOUS.				
Collecting agricultural statistics	100,000.00	100,000.00	100,000.00	100,000.00
Investigations as to extending foreign markets for agricultural products of the United States	10,000.00	10,000.00	10,000.00	10,000.00
Inquiries relating to public roads	10,000.00	10,000.00	10,000.00	10,000.00
Botanical investigations and experiments	30,000.00	25,000.00	30,000.00	30,000.00
Investigating history and habits of insects	20,300.00	20,300.00	20,300.00	20,300.00
Investigations in ornithology and mammalogy	17,500.00	17,500.00	17,500.00	17,500.00
Pomological information	5,000.00	5,000.00	5,000.00	5,000.00
Microscopical investigations	2,000.00	2,000.00	2,000.00	2,000.00
Vegetable pathological investigations and experiments	20,000.00	20,000.00	20,000.00	20,000.00
Laboratory:				
Chemical apparatus, rent, etc	6,900.00	6,900.00	6,900.00	6,900.00
Investigations of food adulterations, etc	15,000.00	5,000.00	5,000.00	5,000.00
Special investigation of soils	.....	3,000.00	3,000.00	3,000.00
Fiber investigations	5,000.00	.....	5,000.00	5,000.00
Forestry investigations	20,000.00	21,500.00	20,000.00	20,000.00
Illustrations and engravings, expenses	2,000.00	4,000.00	15,000.00	2,000.00
Document and folding room, materials	2,000.00	2,000.00	2,000.00	2,000.00
Experimental garden and grounds	31,500.00	29,500.00	29,500.00	29,500.00
Bureau of Animal Industry	850,000.00	700,000.00	800,000.00	800,000.00
Quarantine stations for meat cattle	15,000.00	12,000.00	12,000.00	12,000.00
Purchase and distribution of seeds	130,000.00	30,000.00	160,000.00	160,000.00
Printing seed packets, labels, etc., labor and materials	5,400.00	5,000.00	5,400.00	5,400.00
Experiments in the manufacture of sugar	20,000.00	10,000.00	10,000.00	10,000.00
Office of Agricultural Experiment Stations	25,000.00	25,000.00	25,000.00	25,000.00
Agricultural experiment stations in the several States and Territories	720,000.00	.....	720,000.00	720,000.00
Irrigationin vestigations	6,000.00	8,000.00	8,000.00	6,000.00

a Appropriated for under "Miscellaneous—illustrations and engravings," in gross sum.

Comparative statement showing the appropriations for 1894, etc.—Continued.

Object.	Appropriations, 1894.	Estimates, 1895.	House bill, 1895.	Senate committee, 1895.
MISCELLANEOUS—continued.				
Investigations and report upon the nutritive value of articles and commodities used for human food		$10,000 00	$10,000.00	$10,000 00
Furniture, cases, and repairs	$10,000.00	10,000.00	10,000.00	10,000.00
Postage	5,000.00	5,000.00	5,000.00	5,000.00
Museum	4,000.00	3,000.00	3,000.00	3,000.00
Library	3,000.00	6,000.00	6,000.00	6,000.00
Contingent expenses	25,000.00	25,000.00	25,000.00	25,000.00
Total miscellaneous	2,115,600.00	1,130,700.00	2,100,600.00	2,085,600.00
WEATHER BUREAU.				
For salaries	179,530.00	167,090.00	164,290.00	162,490.00
Fuel, lights, and repairs	9,700.00	8,000.00	8,000.00	8,000.00
Contingent expenses	13,700.00	10,000.00	10,000.00	10,000.00
Salaries of local forecast officials, observers, operators, etc., and necessary civilian employés outside of the city of Washington	344,000.00	341,795.00	347,195.00	347,195.00
All other expenses of the Weather Bureau	404,170.00	327,338.06	347,338.06	347,338.06
Total Weather Bureau	951,100.00	854,223.06	876,823.06	875,023.06
Total number specific salaries Weather Bureau	154	146	147	146
Total Agricultural Department	$3,323,500.00	$2,233,843.06	$3,215,643.06	$3,208,183.06
Total number specific salaries Agricultural Department	323	305	262	302

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 502.

IN THE SENATE OF THE UNITED STATES.

JULY 6, 1894.—Ordered to be printed.

Mr. DIXON, from the Committee on Patents, submitted the following

REPORT:

[To accompany S. 1154.]

The Committee on Patents, to whom was referred the bill (S. 1154) for the relief of John C. Howe, having had the same under consideration, recommend the passage of the bill and submit the following report.

August 16, 1864, letters patent were issued to John C. Howe, of Worcester, Mass., for a metallic cartridge, (copy of specification annexed). Except for experimental purposes it does not appear that any cartridges were ever manufactured by any company or individuals. Between the years 1868 and 1881, without the permission of Howe, the United States manufactured these cartridges, then and since known as "cup-anvil cartridges," the total product being 66,907,313, valued by the United States at $1,635,928.35, of which 5,721,818 were sold, and the United States received in cash for the same about $199,375.96. The balance, 61,185,495, were used by the United States. Howe claimed that the "cup-anvil" cartridge was an infringement of his patent, which was denied by the ordnance officers of the United States. No compensation was made to Howe, who was a poor man and unable to prosecute his claim.

Forehand & Wadsworth, manufacturers of arms at Worcester, Mass., took up the cause of John C. Howe and began its prosecution for him. After the legal title to the patent and to Howe's claim against the United States for infringement had been vested in Forehand & Wadsworth, on May 26, 1881, they, in the circuit court for the district of Connecticut, commenced suit against Samuel W. Porter, then the master armorer at Springfield, Mass. The district attorney for the district of Connecticut appeared and defended the suit, and after the taking of testimony, which was voluminous, the case was argued orally and on printed briefs before District Judge Shipman. On February 10, 1883, the court rendered judgment, finding that the patent was valid and had been infringed by making the "cup anvil."

Afterward Forehand & Wadsworth presented a memorial to Congress setting forth the facts and praying for relief. This memorial was referred to the Committee on Claims of the Senate, and on January 9, 1884, was referred under the Bowman act (the act of March 3, 1883) to the Court of Claims for findings of fact. The testimony in the case in the circuit court was stipulated into the Court of Claims and other testi-

mony taken. The case was argued orally and upon printed briefs in the Court of Claims, where the assistant attorney-general appeared and was heard for the defense; where, after a reargument on some of the issues, the findings and decision of the circuit court were confirmed.

The findings of fact and the opinion of the Court of Claims are hereto annexed.

Your committee, therefore, believe that the United States manufac tured 66,907,313 "cup-anvil" cartridges, by this infringed Howe's patent, and that no compensation has been made for the infringement; that a reasonable royalty for the United States to pay would be $66,907.

Wherefore your committee recommend the passage of the accompanying bill.

SPECIFICATION OF HOWE PATENT.

UNITED STATES PATENT OFFICE.

John C. Howe, of Worcester, Mass.—Improvement in metallic cartridges—Specification forming part of letters patent No. 43851, dated August 16, 1864.

To all whom it may concern:

Be it known that I, John C. Howe, of the city and county of Worcester and State of Massachusetts, have invented certain new and useful improvements in cartridges for fire-arms; and that the following is a full, clear, and exact description of my said invention, reference being had to the accompanying drawing, in which—

Figure 1 represents a side view of a cartridge case embodying my improvements. Fig. 2 represents a longitudinal section of the same on an enlarged scale, showing the primer at the butt. Fig. 3 represents a transverse section of the same at the line *x x* of fig. 2. Fig. 4 represents a side view of a rod, on the same scale as figs. 2 and 3, for withdrawing the cartridge case from the chamber of the firearm. Fig. 5 represents an end view of the same; fig. 6 represents a side view of another form of cartridge case embodying my improvements, with a portion of the butt removed to show its interior.

My invention is applicable principally to the cartridges which are used in repeating firearms.

The first part of my invention consists in combining a perforated diaphragm with the rear end of a cartridge case, so as to strengthen the cartridge case at that part.

The second part of my invention consists in constructing the cartridge case with a groove in its periphery behind the position of the charge; and

The third part of my invention consists in constructing the cartridge case with projections upon its interior, which projections may be used to form an abutment for the ball, or to engage with a rod by whose agency the case may be withdrawn from the chamber of the firearm after firing the charge.

The cartridge cases represented in the annexed drawing embody all parts of my invention. The shell of these cartridge cases is constructed of copper, with a perforated diaphragm, *a*, at the butt. This diaphragm is within the cartridge case; separates the primer (represented in red) from the powder; it strengthens the rear end of the case and forms a species of anvil, on which the primer is sustained when struck by the hammer of the lock, so that any special arrangement of the firearm for this last purpose is rendered unnecessary. It also, by filling up a portion of the case, protects that part from the explosive force of the charge, so that a portion of the wall of the chamber of the firearm opposite the diaphragm may be removed for any desirable purpose without incurring the risk of the swelling or bursting of the cartridge case through the opening thus made when the charge is fired. The form of cartridge case represented at figs. 1, 2, and 3 is adapted to the firearms in which the hammer of the lock strikes downward at an angle upon the corner of the cartridge case. The form represented at fig. 6 is adapted to a firearm in which the hammer strikes through a hole at the butt of the chamber of smaller diameter than the body of the cartridge.

In order to embody the second part of my invention, the rear end of the cartridge in these examples is formed with a groove, *c*, in its exterior. The groove in this position is useful for two purposes: it may be made use of to retain the cartridge in its place in the chamber, by engaging with an instrument which is arranged upon the firearm for that purpose. Moreover, as the metal of the cartridge case is protruded

inward by the formation of the groove, it may be made to constitute the means of securing the perforated diaphragm in its position, either by causing the indented material to enter into a corresponding groove in the periphery of the diaphragm, as at fig. 2, or by locating the groove immediately in front of the diaphragm, as at fig. 6. In case the instrument for engaging in the groove is located farther forward on the firearm than the position of the diaphragm, a groove or indentation should be made in the cartridge-case opposite that point. There may then be one groove at the rear to hold the diaphragm, and another farther forward to engage with the holding instrument. Each groove may be replaced by its equivalent, viz, one or more indentations, but I prefer the grooves.

In order to embody the third part of my invention, each cartridge case is constructed in the present examples with two projections *n n* in its interior. These form an abutment against which the butt of a conical ball may set squarely, so that the powder may be left loose behind it without any risk of the ball being set obliquely in the cartridge. They also constitute a means of engagement with a rod, by whose agency the cartridge case may be readily withdrawn after its contents are discharged. The rod D is constructed with a grooved head *t* in such form that when turned to one position with reference to the projections *n* it will enter between them, and when so entered may be turned to engage the projections *n* of the cartridge case in its grooves *s*. When this engagement is effected the withdrawal of the rod of necessity brings the cartridge case with it. The construction of a cartridge case in this manner, therefore, fits it for use in those firearms whose construction does not permit the cartridge case to be pushed out of the chamber. It is not essential that there should be two projections to engage with the rod, as there may be more or less, provided the head of the withdrawing rod is suitably formed to engage with them; but I prefer to have two, or, at most, three, projections. The easiest way of forming these projections with which I am acquainted is to indent the exterior of the cartridge case, thus forcing the metal inward.

I prefer to manufacture my cartridge cases of thin copper with brass diaphragms, but any other suitable material may be used for the purpose.

Having thus described two forms of cartridge cases embodying my improvements, what I claim as my invention, and desire to secure by letters patent, is—

1. The combination of a perforated diaphragm with the rear end of the shell of a cartridge case in such manner that the diaphragm forms a perforated partition between the primer and the powder, is rigidly secured to the cartridge case, so as to support the primer against the blow of the hammer, and by its breadth of rim protects the part of the cartridge case surrounding it from the explosive force of the powder, substantially as set forth.

2. A cartridge case constructed with a grove in its periphery behind the position of the charge, substantially as herein set forth.

3. A cartridge case constructed with projections in its interior, substantially as herein set forth.

In testimony whereof I have hereunto subscribed my name.

JOHN C. HOWE.

Witnesses:
MELVILLE BIGGS.
E. S. RENWICK.

[Court of Claims. Congressional Case No. 1. Sullivan Forehand and Henry C. Wadsworth *v.* The United States.]

The claim or matter in the above-entitled case was transmitted to the court by the Committee on Claims of the Senate on the 10th day of January, 1884, under the provisions of the act of March 3, 1883, chapter 116, commonly called the Bowman Act.

William H. Kenyon and Cansten Brown, esqs., appeared for claimants, and the Attorney-General by F. P. Dewees, esq., his assistant and under his direction, appeared for the defense and protection of the interests of the United States.

The case having been brought to a hearing, the court upon the evidence, and after considering the briefs and arguments of counsel on both sides, makes the following

FINDINGS OF FACT.

I.

August 16, 1864, letters patent of the United States, numbered 43851, were issued to John C. Howe for improvement in metallic cartridges. Said Howe claimed as his invention the following combination:

(1) The combination of a perforated diaphragm with the rear end of the shell of a

cartridge case in such a manner that the diaphragm forms a perforated partition between the primer and the powder, is rigidly secured to the cartridge case so as to support the primer against the blow of the hammer, and by its breadth of rim protects the part of the cartridge case surrounding it from the explosive force of the powder, substantially as set forth.

(2) The cartridge case constructed with a groove in its periphery behind the position of the charge, substantially as herein set forth.

(3) A cartridge case constructed with projections in its interior, substantially as herein set forth.

In his specification he thus speaks of his invention:

My invention is applicable principally to the cartridges which are used in repeating firearms.

The first part of my invention consists in combining a perforated diaphragm with the rear end of a cartridge case, so as to strengthen the cartridge case at that part.

The second part of my invention consists in constructing the cartridge case with a groove in its periphery behind the position of the charge; and

The third part of my invention consists in constructing the cartridge case with projections upon its interior, which projection may be used to form an abutment for the ball, or to engage with a rod, by whose agency the cartridge case may be withdrawn from the chamber of the firearm after firing the charge.

No one of the different elements of this combination was claimed as new.

II.

The 26th day of April, 1881, said Howe, for a consideration expressed upon the face of the instrument as "one dollar and other good, sufficient, and valuable consideration to me in hand paid," assigned to Henry C. Wadsworth "all the patent" described in Finding I, together with all his "right, title, and interest whatsoever in and to any and all claims for past infringements of said letters patent, and all interests conveyed or surrendered to me by Thomas J. Vail, of Hartford, State of Connecticut, by an instrument in writing dated April 25, A. D. 1881." This assignment was recorded in the Patent Office, in Liber H 26, page 280, of Transfers of Patents, April 30, 1881.

III.

The 28th of April, 1881, said Wadsworth made a similar assignment for same consideration as set forth in the foregoing instrument to plaintiffs herein, their successors or assigns, assigning to them "all the right, title, and interest whatsoever" which he had by the foregoing assignment from Howe, with "all his right, title, and interest whatsoever in and to any and all claims for past infringement of said letters patent and all interests conveyed to me by said John C. Howe" in his said assignment. This assignment was recorded in the Patent Office in Liber H 26, page 280, of Transfers of Patents, April 30, 1881.

IV.

Howe actually received for his assignment some $40, partly paid in money and partly in tools, and, in addition, an agreement on plaintiff's part to employ him in their works at usual wages to make improvements generally in pistols and guns, said Howe being a mechanic. Wadsworth, named in Finding II, was one of the partners in the firm of Sullivan, Forehand & Co. (Forehand & Wadsworth).

V.

In the spring of 1863 Howe gave Thomas J. Vail a power of attorney to assign said patent. April 25, 1881, said Vail released and surrendered said power of attorney to said Howe, which release was recorded in the Patent Office April 30, 1881, in Liber M 26, page 130, of Transfers of Patents.

VI.

The purpose of the power of attorney to Vail was to give to the Connecticut Arms Company the right to manufacture the Howe cartridge and a pistol which Howe had invented.

This company was formed in the spring of 1863, and Howe was promised certain very material but contingent advantages for the use of his patent. The company was not limited in its purpose to the manufacture only of Howe's invention, but contemplated the general business of manufacturing arms and cartridges. It never

did manufacture any of Howe's cartridges for sale, and no such cartridges ever were manufactured by anyone, so far as appears, except some two hundred and twenty-five made for experimental purposes.

The Connecticut company was not successful financially and was wound up after considerable litigation. Vail never did in fact sell under his power of attorney from Howe.

VII.

Howe was a poor man throughout the term of the patent. The Connecticut company employed him as superintendent, but he left it when troubles began and was not familiar with the details of its financial embarrassment and litigation.

The present plaintiffs brought suit against General Benton, then in command of the Springfield Armory, for infringement of the Howe patent in the manufacture of the Government cartridge known by the generic name of the "cup-anvil" cartridge. The defendant died during the progress of the suit, which was thereupon continued against Samuel W. Porter, master armorer in said armory. The suit was brought in the United States circuit court, district of Connecticut, and resulted in a decision by the court to the effect that in the manufacture of the "cup-anvil" cartridges the defendant was infringing the invention of said Howe. This decision is reported in Federal Reporter, Vol. XV, p. 256 (Forehand *v.* Porter).

IX.

The patented invention, if correctly defined by the circuit court of the United States, in the case of Forehand *v.* Porter, referred to in Finding VIII, was new with Howe and was embodied in the "cup-anvil" cartridge.

X.

In 1878, 1879, 1880, and 1881 the following "cup-anvil" cartridges were manufactured and sold by defendant:

1878	7,550
1879	9,710
1880	10,000
1881	10,000
Total	37,260

In 1878, 1879, 1880, and 1881 the following "cup-anvil" cartridges were manufactured by defendant:

1878	2,707,553
1879	3,143,850
1880	4,513,599
1881	286,197
Total	10,651,199

But few "cup-anvil" cartridges have been manufactured since 1881.

The total number of "cup-anvil" cartridges and primed shells manufactured by defendants at their arsenals between August 16, 1864, and August 16, 1881, was 66,907,313.

XI.

The following is a description of said "cup-anvil" cartridge:

It is a center-primed cartridge, metallic case or shell, with a rim around the rear or closed end of the cartridge. The priming or fulminate is contained in a circular pocket in the exterior of the base of a metal cup; that is, into a cartridge shell is forced a metallic cup which rests upon the closed end of the cartridge with its mouth toward the black powder chamber; the bottom of this cup projects upward from the circumference toward the center and the cup, after being forced down upon the solid base of the cartridge case or shell, is held there firmly by crimping the walls of the case or shell over the edge of the cup at its open end. A circular pocket appears therefore in the exterior of the base of this cup, and in this pocket and between the cup and the closed end of the cartridge case or shell is placed the priming or fulminate. Fire is communicated from the fulminate to the black powder through two holes in the bottom of the cup at the extremities of a diameter of the said pocket. The whole area of the apertures is over the fulminate chamber free to receive the flame. The portion of the top of the pocket or bottom of the cup between the two holes serves as the anvil to resist the blow of the hammer or firing pin.

XII.

The following is a drawing of a longitudinal sectional of said "cup-anvil" cartridge:
[Can not be reproduced.]

XIII.

The following is a drawing of a longitudinal section of the Howe cartridge:
[Can not be reproduced.]

XIV.

Except as stated Finding VIII, neither Howe nor plaintiffs submitted the patent to the Government or asked the Government to use the invention or to pay for it, and the Government by no affirmative act recognized any right in the plaintiffs or Howe in the alleged improvement in cartridges. It does not appear that the Government officers who devised the "cup-anvil" cartridges had in fact knowledge of Howe's invention.

XV.

The "cup-anvil" cartridges are not reloaders, but they have certain advantages which cause them to be favored by experts in ordnance.

The Berdan cartridge, which has been manufactured and sold in large numbers, commanded the following royalty:

Ten per cent of the selling price on a production of between fifty and a hundred millions during the years 1867, 1868, 1869, and 1870, when such cartridges were selling for $35 a thousand, and thereafter of 5 per cent of the selling price on a still greater production. The Berdan cartridge is a reloader.

XVI.

A reasonable royalty for defendant to pay for an infringement of the Howe invention, if they have infringed it—they having manufactured 66,907,313 "cup-anvil" cartridges and primed shells—would be $66,907.

XVII.

The shape of the shell or bullet or the use of the flange are not in issue here. This case is strictly limited to the combination set forth in Finding I, which is all plaintiffs rely upon.

XVIII.

The petition in this case was filed in this court January 10, 1884.

BY THE COURT.

Filed April 8, 1889.

OPINION.

[In the Court of Claims. Forehand & Wadsworth *v.* The United States. No. 1. Congressional Case.]

Davis, J., delivered the opinion of the court:

This is a reference under the Bowman Act of a claim for alleged infringement of a patent for cartridges, and the only question of law presented is whether the claim is "barred by virtue of the provisions of any law of the United States." (22 Stat. L., 485.) If so barred, this court is without jurisdiction to find the facts in aid of the Senate committee, which sends the matter to us, as the case would then fall within the express exclusion of section 3 of the act of 1883. (Dunbar's Case, 22 C. Cls. R., 109.) On the other hand, "if it be true that the claimant had no cause of action at any time which might have been asserted in this court," his claim is not barred, and "he has a right to maintain this petition under the present reference." (*I bid.*, 113.)

We must look into the record to some extent before a decision can be reached upon this jurisdictional question, and we must proceed to examine the facts until we reach a point where the claimants or their assignor shall appear to have once had a right of action against the Government which has since ceased in whole or in part to exist through the operation of the statute of limitations.

It appears, then, that one Howe, a mechanic, invented a pistol cartridge, which he patented. The letters patent were issued in August, 1864, and except for experimental purposes no Howe cartridges were ever manufactured by anyone. Howe did not claim that any part of his cartridge was new, but did claim as novel the combination of the different parts.

It does not appear that Howe or his assignees ever had any communication with the Government in relation to his cartridges, and if there was any implied contract, it rests upon user by the Government on the one side and that consent which silence gives on the other.

To this statement there was one exception. In May, 1881, a suit for infringement was brought in the circuit court of the United States for the district of Connecticut by the plaintiffs here, the assignees of the inventor, Howe, against certain officers of the United States who were manufacturing what is commonly called the "cup-anvil cartridge," a cartridge then much used in the Army, and which, it was then and is now alleged, infringed Howe's patent. In that suit plaintiffs were successful, and no appeal, so far as appears, was taken by the defendant there from the circuit court's decision.

Very few "cup-anvil" cartridges have been manufactured since 1881, and the serious financial interest in the case is confined to the years prior to 1882. Howe's patent expired about the time when the Government practically ceased to manufacture the cartridge alleged to be an infringement upon his rights. It is admitted that if Howe or his assignees had a contract it is now too late to appeal to this court for a remedy as to the greater part if not the whole of the claim. The first question presented is whether Howe ever had a contract with the Government.

The first case relating to patents reported in this court is that of Pitcher, decided at the October term of 1863. The facts were, briefly: The warden for the United States penitentiary for the District of Columbia used certain broom machines without the patentee's authority and sold the brooms, and the proceeds were applied to the use of the United States in the management and support of the penitentiary. The claimant sued upon an alleged implied contract, contending, in substance, that he relied upon a promise arising from an implication of law to refund the money received from the brooms sold, and further, that in using his machine the Government had not committed a tort, but had taken private property for public use, and therefore a promise must be implied to make reasonable compensation.

The court, however, held that there was no taking within the meaning of the constitutional provision, which did not intend "that every subordinate officer or petty agent of the United States might undertake to decide for himself when the exigency has occurred or the necessity exists for the seizure and appropriation of the property of the citizen." In this case there was, says the court, "a mistaken and unauthorized use. * * * It was the disturbance or infringement of his right, instead of the caption of his property." The court further held that an implied contract could not rest upon the acts of an agent without power to make an express contract, and while the Government received the money for the brooms made by the machine, still no action upon contract would lie therefor, as the brooms belonged to the United States, and the claimant's interest was not in the brooms, but in the machine. Finally, the court held that upon no theory was a contract to be implied, and the claimant had suffered from infringement only; that is, from a tort. They therefore dismissed the petition (1 C. Cls. R., 7).

Burn's Case rested upon an express contract, whereby the use of the invention (the Sibley tent) by the Government was authorized, and, in distinguishing the two cases, the court said: "Where an officer of the United States, without authority from them, uses in their services a patented invention, the act, being unlawful, is his, not theirs, and he and not they are responsible for it." (4 C. Cls. R., 113; affirmed, 12 Wallace, 246.)

Shavor's Case (4 C. Cls. R., 440) turned upon a point not bearing upon the case at bar; so with Hubbell's Case (5 C. Cls. R., 1, and 6 C. Cls. R., 53), which came here under a special statute.

In Fletcher's Case, where compensation was claimed for the use of a stamp, the court held that the Government did not use the stamp or contract with the claimant. A further point was made, the decision upon which is thus stated in the syllabus of the case: "If the Government adopt the design of one inventor, and a patent is subsequently issued to another for the same device, this court has not jurisdiction of an action for infringement." (11 C. Cls. R., 748.)

A very full discussion of the jurisdiction of this court over cases resting upon contract with the Government for the use of a patent is found in McKeever's Case; therein it appeared that the claimant's invention, a patent cartridge box, had been recognized by the War Department as his invention; it had been examined by proper officers, at his instance, and its use had been recommended. Claimant's ownership of the patent had always been recognized in the Department and he applied for payment as soon as manufacture began, and his right to payment was not then contested.

Upon these facts the court sustained McKeever's contention and gave him judgment. (14 C. Cls. R., 396; affirmed by Supreme Court, without opinion, December 5, 1882.)

Dahlgren's Case came here under a special act of Congress. (16 C. Cls. R., 30.)

In the Pacific Submarine Company (19 C. Cls. R., 234) no question of jurisdiction was discussed.

In Palmer *v.* The United States (19 C. Cls. R., 669), it was conceded on both sides that there was no infringement, and that whatever the Government did was done with consent of the patentee and under his implied license.

In Hubbell's Case (20 C. Cls. R., 354) no jurisdictional point was discussed, and a decision adverse to the claimant was given upon the merits.

In Palmer's Case it appeared that the invention had been submitted to the War Department and approved; thereafter, without express license, the Ordnance Department proceeded to manufacture, and the claimant recovered royalties in this court upon an implied contract. (19 C. Cls. R., 669; 20 C. Cls. R., 432; affirmed November 19, 1888.)

Under the peculiar facts in the Solomons Case the court held that the Government was free to use the invention in suit, and that there could be no presumption of an implied contract on the part of the Government to pay for its use. (21 C. Cls. R., 479; 22 C. Cls. R., 335.)

It will be noticed that in all the cases in which the contention has been sustained here, that there existed an implied contract between the inventor and the Government, there had been communication of some kind between the inventor and proper officers of the Government. The inventor had offered his invention, had called attention to his alleged rights, had claimed compensation, or in some equivalent manner had put the Government upon their guard, and done some act tending to establish privity between them and him.

Neither Howe nor his assignees pursued any such course, and until the beginning of the action in the circuit court the Government seems to have been in ignorance of his claim. Neither plaintiffs nor Howe submitted the patent to the Government or asked the Government to use the invention, or to pay for it, and the Government by no affirmative act recognized any right in the plaintiffs or Howe in the alleged improvement in cartridges. To establish a contract here, therefore, we must proceed to this extent, that a contract for the use of an invention upon which the inventor may rely for the recovery of royalties is to be implied whenever the Government uses an invention, whether through ignorance or carelessness or mistake—that is, such a contract arises from naked use, even perhaps if under a claim of right. A mistaken or unauthorized use of an invention by a Government officer can not, however, create a contract. (United States *v.* Great Falls Manufacturing Company, 112 U. S. R., 657; Langford *v.* United States, 101 U. S. R.; Hollister *v.* Benedict Manufacturing Company, 113 U. S. R., 59.)

That this was not a taking of private property for public use in the sense of the Constitution is no less clear. As the court has said in another case (Pitcher's, 1 C. Cls. R., 7), it was a "disturbance or infringement" of claimant's right, "not a caption of his property."

If, then, there was no contract, if there was no taking of private property for public use, from which a promise to pay would be implied, the claimant had but one remedy against the Government, and that was upon the tort, a remedy only to be obtained from Congress. Never having been a contractor with the Government, he never had a right of action here, and his claim is not barred on that ground.

We do not understand that section 3477 of the Revised Statutes operates as a bar upon a claim. It forbids the transfer of a claim, but leaves the claim itself intact. Consequently it does not affect the jurisdiction of this court under the Bowman Act over cases transmitted to us by Congress or by a committee thereof. On the contrary, it constitutes a defense to a suit by the assignee, and in Congressional cases it is an important fact, showing the title to be in some person other than the present claimant, a fact which must be reported to Congress.

We conclude that we have jurisdiction to find the facts in this case for transmission to the Committee on Claims of the Senate.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 503.

IN THE SENATE OF THE UNITED STATES.

JULY 6, 1894.—Ordered to be printed.

Mr. GORMAN, from the Committee on Appropriations, submitted the following

REPORT:

[To accompany H. R. 6748.]

The Committee on Appropriations, to whom was referred the bill (H. R. 6748) making appropriations for the naval service for the fiscal year ending June 30, 1895, and for other purposes, report the same to the Senate with various amendments and submit herewith a comparative statement showing the estimates for this service for the fiscal year 1895, the amounts provided by the bill as passed the House of Representatives, the amount recommended by the committee, and the amount of the naval appropriation act for 1894.

NAVAL SERVICE, 1895.

Amount of estimates for 1895	$27,875,914.02
Supplemental estimates	75,365.77
Total estimates	27,951,279.79
Amount of House bill	25,339,580.27
Reduction recommended by committee (net)	124,500.00
Amount as reported to the Senate	25,215,080.27
Amount of naval appropriation act for 1894	22,104,061.38
The bill as reported is less than estimates	2,736,199.52
The bill as reported exceeds appropriations for 1894	3,111,018.89

The changes recommended by the committee in amounts of House bill are as follows, viz:

INCREASE.

For purchase of Ourdan & Kolb letter-engraving machine	$20,000.00
For Naval Academy gas plant, repairs	5,000.00
For paving streets about Naval Academy	13,000.00
For repair of ship *Constitution*	8,000.00
For payment of speed premiums on gunboats *Machias* and *Castine*	90,000.00
For payment of speed premium on steel practice vessel *Bancroft*	45,000.00
Total increase	181,000.00

REDUCTION.

For modern battery for the *Hartford*	150,000.00
For steam tug at Mare Island Navy-Yard	50,000.00
For new machinery for the *Hartford*	100,000.00
For additional number of naval cadets	5,500.00
Total reduction	305,500.00
Net reduction	124,500.00

Comparative statement showing the appropriations for 1894, the estimates for 1895, the amounts provided by the House bill, and the amounts recommended by the Senate Committee on Appropriations for 1895.

Object.	Appropriations, 1894.	Estimates, 1895.	House bill, 1895.	Senate committee, 1895.
GENERAL EXPENSES.				
Pay of the Navy	$7,300,000.00	$7,475,000.00	$7,475,000.00	$7,475,000.00
Pay, miscellaneous	240,000.00	240,000.00	240,000.00	240,000.00
Contingent expenses, Navy	7,000.00	7,000.00	7,000.00	7,000.00
Total general expenses	7,547,000.00	7,722,000.00	7,722,000.00	7,722,000.00
BUREAU OF NAVIGATION.				
Gunnery exercises	6,000.00	6,000.00	6,000.00	6,000.00
Ocean and lake surveys	14,000.00	14,000.00	14,000.00	14,000.00
Bounties for outfits for naval apprentices	30,000.00	33,750.00	30,000.00	30,000.00
Recruiting, transportation, and contingent	45,000.00	45,000.00	45,000.00	45,000.00
Naval training station, Coasters Harbor Island, viz:				
Dredging channels, repairs, and maintenance	30,000.00	30,000.00	30,000.00	30,000.00
Building retaining wall, etc	2,500.00	.....	.....	.....
Two boilers and extension of boiler house	7,000.00	.....	.....	.....
Purchase of dynamo, etc	4,500.00	.....	.....	.....
Barracks, wash and bath houses, etc	.....	125,000.00	.....	.....
Quarters for commandant	.....	15,000.00	.....	.....
Naval War College and Torpedo School, Coasters Harbor Island	8,000.00	8,000.00	8,000.00	8,000.00
Purchase of the Ourdan and Kolb letter-engraving machine	.....	.....	.....	20,000.00
Total Bureau of Navigation	147,000.00	276,750.00	133,000.00	153,000.00
BUREAU OF ORDNANCE.				
Ordnance and ordnance stores	180,000.00	180,000.00	180,000.00	180,000.00
Expenses of target practice	15,000.00	15,000.00	15,000.00	15,000.00
Maintenance of new proving ground	5,000.00	5,000.00	5,000.00	5,000.00
Modern battery for the Hartford	.....	150,000.00	150,000.00	.....
Repairs, Bureau of Ordnance	30,000.00	30,000.00	30,000.00	30,000.00
Buildings at naval magazine, Mare Island, to replace those destroyed by an explosion	.....	17,900.00	17,900.00	17,900.00
Torpedo station, Newport, R. I., viz:				
Labor, material, etc., and torpedo outfits	60,000.00	60,000.00	60,000.00	60,000.00
Replacing gun-cotton factory destroyed by fire	.....	11,077.00	11,077.00	11,077.00
Arming and equipping naval militia	25,000.00	25,000.00	25,000.00	25,000.00
Gun plant, navy-yard, Washington, D. C	.....	117,000.00	117,000.00	117,000.00
Civil establishment under Bureau	26,824.00	26,824.00	26,824.00	26,824.00
Contingent expenses under Bureau	8,000.00	8,000.00	8,000.00	8,000.00
Total, Bureau of Ordnance	349,824.00	645,801.00	645,801.00	495,801.00
BUREAU OF EQUIPMENT.				
Equipment of vessels	925,000.00	1,100,000.00	1,090,000.00	1,090,000.00
Civil establishment under Bureau	19,025.00	19,025.00	19,025.00	19,025.00
Contingent expenses under Bureau	12,000.00	12,000.00	12,000.00	12,000.00
Total, Bureau of Equipment	956,025.00	1,131,025.00	1,121,025.00	1,121,025.00
BUREAU OF YARDS AND DOCKS.				
Maintenance of yards and docks	230,000.00	250,000.00	250,000.00	250,000.00
Contingent expenses under Bureau	15,000.00	15,000.00	15,000.00	15,000.00
Civil establishment under Bureau	61,494.54	61,494.54	61,494.54	61,494.54
Naval Home, Philadelphia, Pa	69,215.00	77,315.00	80,465.00	80,465.00
Total	375,709.54	403,809.54	406,959.54	406,959.54
Public works—navy-yards and stations, viz:				
Portsmouth, N. H., navy-yard	15,000.00	.....	.....	.....
Boston, Mass., navy-yard	20,000.00	15,000.00	15,000.00	15,000.00
Brooklyn, N. Y., navy-yard	300,000.00	140,000.00	140,000.00	140,000.00
League Island, Pa., navy-yard	78,000.00	86,900.00	81,900.00	81,900.00
Washington, D. C., navy-yard	30,500.00	50,044.00	50,044.00	50,044.00
Norfolk, Va., navy-yard	23,000.00	43,000.00	38,000.00	38,000.00
Norfolk, Va., navy-yard, relading storehouse	.....	(a)	72,365.77	72,365.77

a Supplemental estimate of $72,365.77.

Comparative statement showing the appropriations for 1894, etc.—Continued.

Object.	Appropriations, 1894.	Estimates, 1895.	House bill, 1895.	Senate committee, 1895.
BUREAU OF YARDS AND DOCKS—continued.				
Public works—Continued.				
Port Royal, S. C., naval station	$12,096.00	$18,368.00	$18,368.00	$18,368.00
Algiers, La., dry dock	25,000.00			
Mare Island, Cal., navy-yard	41,648.00	37,019.00	79,019.00	29,019.00
Puget Sound, Wash., dry-dock and naval station	225,000.00	3,500.00	6,079.83	6,079.83
Key West, Fla., naval station		10,000.00	10,000.00	10,000.00
Repairs and preservation at navy-yards and stations	275,000.00	300,000.00	300,000.00	300,000.00
	1,045,244.00	703,831.00	810,776.60	760,776.60
Naval Academy, buildings and grounds	56,000.00	10,000.00	10,000.00	28,000.00
New Naval Observatory, grounds, etc	16,500.00	23,956.00	23,956.00	23,956.00
	1,117,744.00	737,787.00	844,732.60	812,732.60
Total, Bureau of Yards and Docks	1,493,453.54	1,141,596.54	1,251,692.14	1,219,692.14
BUREAU OF MEDICINE AND SURGERY.				
Medical supplies	60,000.00	60,000.00	60,000.00	60,000.00
Naval hospital fund	20,000.00	20,000.00	20,000.00	20,000.00
Contingent expenses under Bureau	25,000.00	25,000.00	25,000.00	25,000.00
Repairs under Bureau	20,000.00	20,000.00	20,000.00	20,000.00
Total, Bureau of Medicine and Surgery	125,000.00	125,000.00	125,000.00	125,000.00
BUREAU OF SUPPLIES AND ACCOUNTS.				
Provisions, commuted rations, and fresh water	990,000.00	1,075,000.00	1,075,000.00	1,075,000.00
Labor in general storehouses and paymasters' offices in navy-yards	100,000.00	100,000.00	100,000.00	100,000.00
Contingent expenses under Bureau	40,000.00	45,000.00	45,000.00	45,000.00
Civil establishment under Bureau	67,532.03	67,532.03	67,532.03	67,532.03
Consolidating naval supplies	30,000.00			
Total, Bureau of Supplies and Accounts	1,227,532.03	1,287,532.03	1,287,532.03	1,287,532.03
BUREAU OF CONSTRUCTION AND REPAIR.				
Construction and repair of vessels	950,000.00	900,000.00	900,000.00	900,000.00
Repair of the ship Constitution				8,000.00
Civil establishment under Bureau	19,972.50	19,972.50	19,972.50	19,972.50
Total, Bureau of Construction and Repair	969,972.50	919,972.50	919,972.50	927,972.50
BUREAU OF STEAM ENGINEERING.				
Steam machinery	445,000.00	425,000.00	425,000.00	425,000.00
Purchase, preservation, etc., of material and stores, and machinery and tools in navy-yards and stations	240,000.00	240,000.00	240,000.00	240,000.00
Incidental expenses under Bureau	10,000.00	10,000.00	10,000.00	10,000.00
	695,000.00	675,000.00	675,000.00	675,000.00
Steam machinery, special, viz:				
For U. S. S. Chicago		200,000.00	200,000.00	200,000.00
For U. S. S. Hartford		100,000.00	100,000.00	
For tug Standish, at Naval Academy		15,000.00	15,000.00	15,000.00
For tug Speedwell, at Norfolk, Va		15,000.00	15,000.00	15,000.00
Contingent expenses under Bureau	1,000.00	1,000.00	1,000.00	1,000.00
Civil establishment under Bureau	11,900.00	11,900.00	11,900.00	11,900.00
Total, Bureau of Steam Engineering	707,900.00	1,017,900.00	1,017,900.00	917,900.00
NAVAL ACADEMY.				
General expenses of the Academy	187,065.45	187,101.45	187,101.45	187,101.45
Additional naval cadets authorized			5,500.00	
Total, Naval Academy	187,065.45	187,101.45	192,601.45	187,101.45

Comparative statement showing the appropriations for 1894, etc.—Continued.

Object.	Appropriations, 1894.	Estimates, 1895.	House bill, 1895.	Senate committee, 1895.
MARINE CORPS.				
Pay of the Marine Corps	$696,478.36	$702,000.00	$700,820.65	$700,820.65
Provisions	80,000.00	80,000.00	80,000.00	80,000.00
Clothing	75,000.00	80,000.00	80,000.00	80,000.00
Fuel	19,500.00	19,500.00	19,500.00	19,500.00
Military stores	13,286.50	13,286.50	13,286.50	13,286.50
Transportation and recruiting	15,000.00	15,000.00	15,000.00	15,000.00
Repairs of barracks	29,600.00	*a* 17,000.00	20,000.00	20,000.00
Forage	2,800.00	2,800.00	2,800.00	2,800.00
Hire of quarters	6,624.00	6,624.00	6,624.00	6,624.00
Contingent expenses	30,000.00	30,000.00	30,000.00	30,000.00
Total, Marine Corps	968,288.86	966,210.50	968,031.15	968,031.15
International naval rendezvous and review	300,000.00	.....	.....	.....
INCREASE OF THE NAVY.				
Armor and armament of new vessels	(*b*)	6,500,000.00	4,000,000.00	4,000,000.00
Equipment of new vessels	250,000.00	.....	.....	.....
Construction and steam machinery	6,875,000.00	5,955,025.00	5,955,025.00	5,955,025.00
Payment of speed premiums on gunboats Machias and Castine	.....	.....	.....	90,000.00
Payment of steel premium on steel practice vessel Bancroft	.....	.....	.....	45,000.00
Total, Increase of the Navy	7,125,000.00	12,455,025.00	9,955,025.00	10,090,025.00
Total, Naval Service	22,104,061.38	27,875,914.02	25,339,580.27	25,215,080.27
Supplemental estimates for 1895	.....	75,365.77	.....	.....
Total, Naval Service	22,104,061.38	27,951,279.79	25,339,580.27	25,215,080.27

a Supplemental estimate of $3,000 for marine barracks at Boston.
b Appropriation made of all balances on hand July 1, 1893, to credit of appropriations for armor and armament of vessels.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 504.

IN THE SENATE OF THE UNITED STATES.

JULY 6, 1894.—Ordered to be printed.

Mr. PALMER, from the Committee on Pensions, submitted the following

REPORT:

[To accompany H. R. 3076.]

The Committee on Pensions, to whom was referred the bill (H. R. 3076) granting a pension to George L. Frymire, have examined the same and report:

The report of the Committee on Invalid Pensions of the House of Representatives hereto appended is adopted, and the passage of the bill is recommended.

HOUSE REPORT.

The Committee on Invalid Pensions have considered the bill (H. R. 3076) granting a pension to George L. Frymire, and submit the following report:

The petitioner is the son of William C. Frymire, who enlisted in Company B, Fifty-sixth Illinois Infantry, November 6, 1861, and was honorably discharged September 20, 1862, and died June 15, 1876, his death being accepted by the Pension Bureau as a result of his military service. The widow of the soldier died January 1, 1886. Two minor children were allowed pension from the date of soldier's death, pension ceasing December 22, 1891, when the youngest became 16 years of age; since which date no pension has been paid.

The petitioner is 22 years of age and is entirely disabled, and has been from infancy; both legs are useless; he can not bear his weight on them or move about without crutches, the legs being shriveled and powerless; the left arm is deformed and the hand twisted; he can perform no manual labor, and for the past two years he has been supported by Hamilton County, Ill.

John Hawthorn, of McLeansboro, Ill., and A. W. Rankin and Margaret Beck, of Thackery, Ill., testify to the relationship of the petitioner to the soldier and his permanent helplessness from infancy, and his present dependence.

Dr. J. J. Hassett, of McLeansboro, testifies that the petitioner is in worse condition even than he alleges; that the left leg is 6 or 8 inches shorter than the other, the muscles are entirely perished; it is twisted, small, and shriveled, and the right leg is little better; the left arm is small, crooked, twisted, and deformed, and so weak he can scarcely carry a crutch, and he is wholly dependent on others for support.

James M. Campbell, supervisor of Crook Township, testifies that for three years the petitioner has been supported mainly at the expense of the county; he is wholly unable to earn a living and is dependent on others.

Your committee recommend that the bill do pass after being amended by inserting the words "permanently helpless" before the word "son" in line 6, and by striking out all of the bill after the word "Infantry" in line 8.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 505.

IN THE SENATE OF THE UNITED STATES.

JULY 6, 1894.—Ordered to be printed.

Mr. GORMAN, from the Committee on Printing, submitted the following

REPORT:

[To accompany Senate joint resolutions (S. R. 76 and S. R. 85), providing for the printing of the proceedings of the Tribunal of Arbitration at Paris relating to fur seals.]

The Committee on Printing, to whom was referred the accompanying Senate joint resolutions, having considered the same, report them back with the recommendation that they be indefinitely postponed and that in lieu thereof the following concurrent resolution be adopted:

PROPOSED SUBSTITUTE.

Resolved by the Senate (*the House of Representatives concurring*), That there be printed, under the direction of the Committee on Foreign Relations of the Senate, six thousand copies of the official proceedings of the Tribunal of Arbitration, created in pursuance of the treaty of February twenty-ninth, eighteen hundred and ninety-two, between the United States and Great Britain, including all documents, papers, and agreements presented officially to said tribunal by the agents of said governments, respectively, and also including the written or printed arguments and the oral arguments of the counsel on behalf of each of said governments made on said hearing at Paris, and the opinions of the arbitrators, respectively, delivered in said tribunal in conformity with its order admitting the same to constitute a part of said proceedings; of which number one thousand five hundred shall be for the use of the Senate, three thousand for the use of the House of Representatives, and one thousand five hundred for the use of the Department of State.

The Public Printer estimates the cost of the substitute concurrent resolution at $92,359.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 506.

IN THE SENATE OF THE UNITED STATES.

JULY 9, 1894.—Ordered to be printed.

Mr. COCKRELL, from the Committee on Appropriations, submitted the following

REPORT:

[To accompany H. R. 7097.]

The Committee on Appropriations, to whom was referred the bill (H. R. 7097) making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year ending June 30, 1895, and for other purposes, report the same to the Senate with various amendments, and present herewith a statement showing the changes recommended by the committee in the amount of the bill as passed the House of Representatives, the amount of the estimates for the fiscal year, 1895, the amount of the House bill, the amount recommended by the committee, and the amount of the appropriations made by the legislative, executive, and judicial appropriation act for the fiscal year 1894.

LEGISLATIVE, 1895.

Amount of estimates for 1895	$22,310,510.33
Amount of House bill	21,105,787.29
Increase recommended by Senate committee	242,002.50
Amount as reported to the Senate	21,347,789.79
Amount of act for 1894	21,865,802.81
The bill as reported is less than the estimates	962,720.54
The bill as reported is less than act for 1894	518,013.02

The changes recommended by the committee in amounts of House bill are as follows:

INCREASE.

Senate	$12,180.00
Civil Service Commission	52,000.00
Editing and distributing laws and statutes at large, Fifty-third Congress	1,000.00
Treasury Department, salaries	68,522.50
Office assistant treasurer at Cincinnati	1,200.00
Territory of New Mexico	1,500.00
Territory of Oklahoma	1,000.00
Rent, medical dispensary	1,000.00
Superintendent of Naval Observatory, salary	5,000.00
Special pension examiners and expenses	100,000.00
Professional and scientific books for Patent Office	750.00

Land Office, map of Florida	$1,000.00
Office Commissioner of Railroads, expenses, etc	500.00
Offices of surveyors-general	7,100.00
Court of Claims	200.00
Total increase	252,952.50

REDUCTION.

Record and Pension Office and Adjutant-General's Office, net	$2,400.00
Pension Office, salaries	5,200.00
Post-Office Department	1,400.00
Office of the Attorney-General	1,950.00
Total reduction	10,950.00
Net increase	242,002.50

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 507.

IN THE SENATE OF THE UNITED STATES.

JULY 9, 1894.—Ordered to be printed.

Mr. PASCO, from the Committee on Public Lands, submitted the following

REPORT:

[To accompany H. R. 3458.]

The Committee on Public Lands, to whom was referred the bill (H. R. 3458) extending the time for final proof and payment on lands claimed under the public land laws of the United States, have had the same under consideration, and report it back with the recommendation that it pass, with an additional section as an amendment.

SEC. 2. That the time of making final payments on entries under the preemption act is hereby extended for one year from the date when the same becomes due in all cases where preemption entrymen are unable to make final payments from causes which they can not control, evidence of such inability to be subject to the regulations of the Secretary of the Interior.

The amendment proposed provides for the extension of the benefits of the act to all cases where preemption entrymen are unable to make final payments from causes which they can not control, and leaving to the Secretary of the Interior to make the necessary regulations governing the application of the law.

The proposed amendment is approved by the Secretary of the Interior, and the committee see no reason why it should not become law.

The committee adopt the report of the House Committee herein.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 508.

IN THE SENATE OF THE UNITED STATES.

JULY 10, 1894.—Ordered to be printed.

Mr. MARTIN, from the Committee on Public Lands, submitted the following

REPORT:

[To accompany H. R. 6080.]

The Committee on Public Lands, to whom was referred the bill (S. 995) to donate the military reservation at Oklahoma City, in Oklahoma Territory, to said city for the use and benefit of the free public schools thereof, and for other purposes, and also the bill (H. R. 6080) granting a certain military reservation to Oklahoma City, Oklahoma Territory, to aid the public free schools thereof, and for other purposes, have had said bills under consideration, and the committee recommends that S. 995 be indefinitely postponed. The committee further recommend that H. R. 6080 be amended as follows:

After the word "city," in line 15 of section 2 of said bill, insert as follows:

That prior to the division and sale of said lands, as provided for in the third section of this act, said city of Oklahoma shall, by proper deed, convey to Benjamin S. Miller 10 acres of said land in the form of a square, as nearly as practicable, out of the northwest corner of said southwest quarter of section 34, in township numbered 12 north, of range 3 west: *Provided*, That said Miller shall, at the same time, by a proper instrument in writing, release and assign to said city of Oklahoma any and all right and interest that he may have in or to the remainder of said quarter section of land.

Also amend said bill by adding after the word "purchasers," in line 9 of section 3 of said bill, as follows:

Provided, That this act shall not be so construed as to impair or destroy any legal claim or right that any person or persons may have acquired in or to said lands, or any part thereof, under any of the public land laws of the United States, prior to the passage of this act.

And as amended the committee recommend the passage of said H. R. 6080.

The committee submits as a part of its report the accompanying documents marked A, B, C, D, E, and F.

EXHIBIT B.

STATE OF NEW YORK, *County of Broome, ss:*

Benjamin S. Miller, being duly sworn, deposes and says that he resides at Oklahoma, Okla. T., and is now temporarily at Binghamton, Broome County, N. Y.

That deponent went to Oklahoma early in October, 1888, and has ever since been a resident thereof.

That deponent is a married man and has valuable improvements on a part of the military reservation, so called and known, at Oklahoma City, such improvements costing him at least $1,400, and were erected by him in good faith and without any idea or purpose of becoming a "sooner" or getting any advantage of any person or of the Government.

That deponent went to work for the Government at the time he first became a resident of Oklahoma; and at the time such improvements were made was in such employ, engaged in forwarding to the Indian agency at Darlington, and had no knowledge of the law relating to settlement upon lands, but believed that he would be permitted to take the lands on paying the Government price when the Government was done with it.

That a portion of such improvements were made before the lands were taken as a reservation.

That all the property he has in the world is in such lands and improvements.

That deponent has conferred with the school board of Oklahoma City, and said board, recognizing deponent's equity in the lands, is willing, if authority is given, to give to deponent 10 acres in the northwest corner of the reservation.

BENJ. S. MILLER.

Subscribed and sworn to before me this 6th day of April, A. D. 1894.

[SEAL.] FRANK STEWART,
Notary Public.

EXHIBIT C.

[House Report No. 525. Fifty-third Congress, second session.]

The Committee on the Public Lands, to whom was referred the bill (H. R. 1975) donating the military reservation at Oklahoma City, in Oklahoma Territory, to said city for the use and benefit of the free public schools thereof, and for other purposes, have had the same under consideration and report it back with the recommendation that it be laid upon the table, and that the accompanying substitute therefor be passed.

The land involved is an abandoned military reservation in Oklahoma Territory, located east of and adjoining Oklahoma City, and exclusive of special grants to the railroad companies and the reservation for public buildings and parks contains about 100 acres.

The first section of the bill is a description of the grant of land conveyed. The second section provides for the setting apart of not less than 10 acres of the reservation, to be used by the city for the location of public buildings and a public park; also authorizes the Southern Kansas Railway Company to purchase for depot and railway purposes, not exceeding 6 acres, adjoining its present right of way, the price to be paid therefor to be fixed by 3 appraisers to be appointed by the Secretary of the Interior within ninety days from the passage of this act, and also confirms the right of way and depot grounds of the Choctaw Coal and Railway Company, now occupied by it under permits from the Secretary of War.

The third section provides for the division of the remainder of the land granted into lots and blocks corresponding, as near as practicable, with the plan of the city of Oklahoma, reserving all streets and alleys for the use of the public, and providing that all money received from the sale of all property disposed of under the provisions of the bill to be paid to the school board of Oklahoma City. The fourth section provides for the issuance of the necessary title papers by the Secretary of the Interior in accordance with the provisions of the act.

The Commissioner of the General Land Office in a report to the Secretary of the Interior dated December 2, 1893, states:

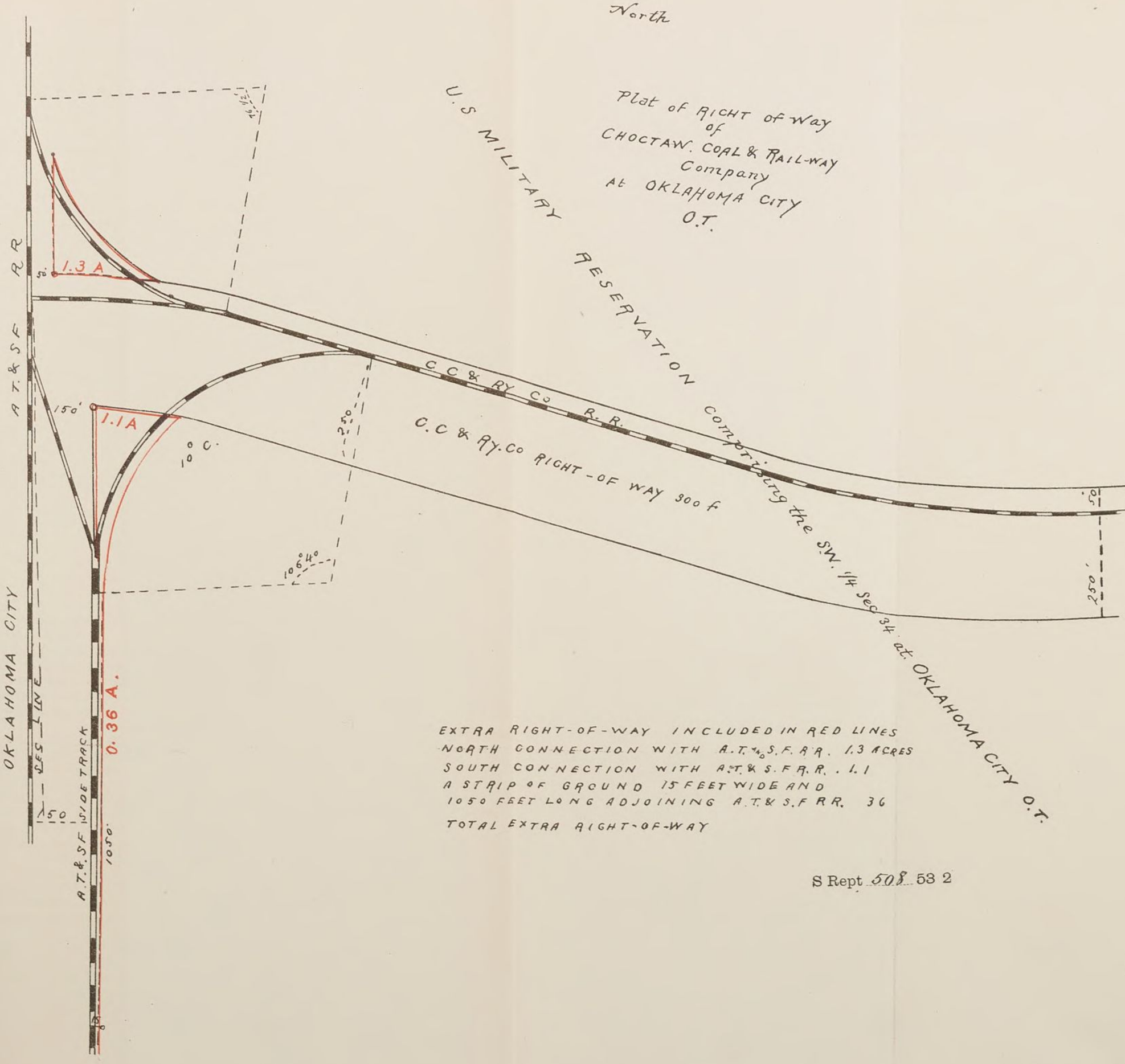
"On April 20, 1889, by order of the President, the tract referred to, to wit, the SW. ¼ sec. 34, T. 12 N., R. 3 W., Indian meridian, was reserved for military purposes.

"On September 28, 1892, said reservation was transferred, by the War Department, to the honorable Secretary of the Interior under the act approved July 5, 1884,

Exhibit A

North

Plat of RIGHT of Way
of
CHOCTAW. COAL & RAIL-WAY
Company
At OKLAHOMA CITY
O.T.



EXTRA RIGHT-OF-WAY INCLUDED IN RED LINES
NORTH CONNECTION WITH A.T.& S.F.R.R. 1.3 ACRES
SOUTH CONNECTION WITH A.T.& S.F.R.R. 1.1
A STRIP OF GROUND 15 FEET WIDE AND
1050 FEET LONG ADJOINING A.T.& S.F RR. 36
TOTAL EXTRA RIGHT-OF-WAY

(23 U. S. Stat., 103), 'for disposition under the second section of the aforesaid act or as may be otherwise required by law.'

"April 12, 1893, O. A. Mitscher, mayor of Oklahoma City, Okla., filed an application to enter said tract under the act of Congress entitled 'An act to authorize entry of public lands by incorporated cities and towns for cemetery and park purposes,' approved September 30, 1890 (26 Stat., 502), and a number of applications to enter the same under the agricultural-land laws have been filed, all of which applications were rejected by the local officers, from which rejection appeals are now pending before this office. But no vested rights have attached to said tract, and the land having become quite valuable because of its proximity to Oklahoma City, the disposition of the same proposed in the bill under consideration appears to me to be wise and appropriate.

"By my letter, 'E,' dated June 18, 1892, I reported favorably upon a similar bill, being House bill No. 8004, Fifty-second Congress, first session.

"For the reasons stated I am of the opinion that this bill should become a law."

Accompanying the letter from which the above quotation is made, is the following from the Secretary of the Interior:

DEPARTMENT OF THE INTERIOR,
Washington, December 15, 1893.

SIR: I transmit herewith a report from the Commissioner of the General Land Office on House bill 1975, entitled "A bill donating the military reservation at Oklahoma City, in Oklahoma Territory, to said city for the use and benefit of the free public schools thereof, and for other purposes."

This Department has no objection to urge against the passage of the bill if it should be deemed proper to dispose of the lands therein referred to in the manner provided for by the bill.

Very respectfully,

HOKE SMITH,
Secretary.

Hon. THOMAS C. MCRAE,
Chairman of Committee on Public Lands, House of Representatives.

EXHIBIT D.

REVOCABLE LICENSE.

The Choctaw Coal and Railway Company is hereby granted a license, revocable at will by the Secretary of War, to occupy and use, for the purpose of making an advantageous connection of its railway with the Atchison, Topeka and Santa Fe Railroad, that part of the United States military reservation at Oklahoma City, Oklahoma Territory (the SW. ¼, sec. 34, T. 12 N., R. 3 W., Ind. M.), indicated as included in red lines on the map thereto attached, and described on said map as composed of three parcels of land, amounting in all to two and seventy-six hundredths acres, upon the following provisions and conditions:

(1) That immediately after making the connection with the Atchison, Topeka and Santa Fe Railroad the said company shall construct, between the said parcels of land and the rest of the said reservation, a substantial post and board fence, four and one-half feet high, and having four pine boards, each not less than six inches wide; shall provide said fence with such gates as may be required by the commanding officer of the post, and shall at all times keep said fence and gates in good order and repair—the work to be done in compliance with this condition to be subject to the approval of the said commanding officer.

(2) That upon the revocation of this license the said company shall, at its own expense, and within such time as the Secretary of War may designate, remove the sidings and other property which it may have on the licensed premises, and upon its refusal, neglect, or inability to remove the same then the Secretary of War may cause them to be removed at the said company's expense; and no claim for damage against the United States, or any agent thereof, shall be founded on such removal.

(3) That any sum which may have to be expended, after revocation of this license, in putting any premises or property hereby authorized to be occupied or used in as good condition for use by the United States as it is at this date shall be repaid by said the Choctaw Coal and Railway Company on demand.

Witness my hand this twenty-sixth day of July, 1892.

J. M. SCHOFIELD,
Major-General, Acting Secretary of War.

This license, with the terms, provisions, and conditions set out therein, is hereby accepted this twenty-first day of July, 1892.

Signed in presence of—

CHOCTAW COAL AND RAILWAY COMPANY,
By CHAS. HARTSHORNE,
President.

FRANCIS I. GOWNE,
Acting Receiver Choctaw Coal and Ry. Co.

Attest:
FRANK T. PATTERSON,
Secretary.

[SEAL.]

EXHIBIT E.

WAR DEPARTMENT,
Washington, D. C., March 12, 1894.

SIR: I have the honor to advise you of the reference to the honorable Secretary of the Interior of House bill 1975, Fifty-third Congress, First session, donating the military reservation at Oklahoma City, Okla., to that city for the use and benefit of the free public schools thereof, as that military reservation was, by authority of the President, dated September 29, 1892, transferred on October 4, 1892, to the Secretary of the Interior for disposition under the act of Congress approved July 5, 1884, entitled "An act to provide for the disposal of useless and abandoned military reservations."

Very respectfully,

DANIEL S. LAMONT,
Secretary of War.

The CHAIRMAN OF THE COMMITTEE ON THE PUBLIC LANDS,
House of Representatives.

EXHIBIT F.

DEPARTMENT OF THE INTERIOR,
Washington, March 15, 1894.

SIR: I have the honor to state that on the 12th instant the Secretary of War referred to this Department your letter of the 16th ultimo to him, asking to be furnished with a copy of the permits heretofore granted to the Choctaw Coal and Railroad Company to occupy lands on the military reservation at Oklahoma City, Okla.; also of a map of the reservation showing the location and width of the grant.

With the letter there was referred a copy of the revocable license granted the company named by the Secretary of War, accompanied by a tracing of the lands covered thereby, and, as these comply fully with your request, they are herewith inclosed.

Very respectfully,

HOKE SMITH,
Secretary.

Hon. THOMAS C. MCRAE,
Chairman Committee on Public Lands, House of Representatives.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 509.

IN THE SENATE OF THE UNITED STATES.

JULY 10, 1894.—Ordered to be printed.

Mr. PASCO, from the Committee on Public Lands, submitted the following

REPORT:

[To accompany H. R. 7334.]

The Committee on Public Lands, to whom was referred the bill (H. R. 7334) to sell certain lands in Montgomery County, Ark., to the Methodist Episcopal Church, South, respectfully report:

In this case the evidence submitted to the committee shows that the tract of land in question is rugged, rocky, and so poor as to be unfit for cultivation; that it has no timber of value and is nonmineral.

Its desirability for the purposes mentioned in the bill consists in the fact that there is a bold, never-failing spring of excellent water upon it, and the tract has been used for some years by the Methodist people of the county for holding the annual camp meetings.

These people desire to erect more permanent and costly habitations on the tract than they now have, and for their protection want to acquire the title.

The price named in the amendment, $1.25 per acre, is the minimum Government price of lands owned by the United States, and your committee are of opinion that no injustice will be done the Government by the passage of the bill.

The committee recommend the following amendments:

After the word "Arkansas," in line 6, insert "if there be found no adverse claim to the same," and after the word "acre," in line 10, insert "and to patent the same to them and their successors upon payment of the purchase money," and also strike out the whole of section 2.

And when thus amended, the committee recommend the passage of the act.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 510.

IN THE SENATE OF THE UNITED STATES.

JULY 10, 1894.—Ordered to be printed.

Mr. COCKRELL, from the Committee on Appropriations, submitted the following

REPORT:

[To accompany H. R. 6913.]

The Committee on Appropriations, to whom was refered the bill (H. R. 6913) making appropriations for current and contingent expenses of the Indian Department and fulfilling treaty stipulations with various Indian tribes for the fiscal year ending June 30, 1895, and for other purposes, having considered the same, report the bill to the Senate and present herewith a statement showing amount of the estimates for this service for the fiscal year 1895, the amount provided by the House bill, the amount recommended by the Senate committee, and the amount of the appropriations for the fiscal year 1894.

INDIAN SERVICE, 1895.

Amount of estimates for 1895	$6,931,156.61
Amount of bill as passed the House	6,735,518.90
Increase recommended by committee	2,591,867.79
Amount as reported to the Senate	9,327,386.69
Amount of act for 1894	7,854,240.38

The changes in amounts of House bill recommended by the committee are as follows:

INCREASE.

Restoring salary of superintendent of Indian schools, and traveling expenses of same	$4,500.00
Restoring amount for Indian commission	5,000.00
For Pottawatomies of Indiana and Michigan	2,081.30
For Apaches, Kiowas, Comanches, and Wichitas	10,000.00
For support, etc., of Digger Indians of California	10,000.00
For rebuilding bridge across Big Wind River on Shoshone Indian Reservation	2,500.00
For operating and repairing flour mill at Pima Agency, Ariz	1,220.00
For erection of flour and saw mill at Shoshone Agency, Wyo	6,000.00
For Indian police	15,000.00
For telegraphing and purchase of Indian supplies	10,000.00
For transportation of Indian supplies	18,000.00
For survey and subdivision of Indian reservations	40,000.00

For survey of lands in Indian Territory known as Five Civilized Tribes lands	$5,000.00
For negotiations with Indians	5,000.00
For payment to settlers removed from Crow Creek and Winnebago Indian Reservation	3,000.00
For payment to Eugene E. White	69.49
For expenses of Old Settler Cherokees	5,000.00
For Indian day and industrial schools	25,000.00
For building at North Carolina Cherokee training school	3,000.00
For Indian school at Carlisle, Pa	6,000.00
For Indian school at Flandreau, S. Dak	1,500.00
For repair of church and building on San Xavier Reservation, in Arizona	1,000.00
For water supply at Santa Fe, N. Mex., Indian school	500.00
For expenses under agreement with Yankton Sioux, additional amount	611,475.00
For expenses under agreement with Siletz Reservation Indians	132,600.00
For expenses under agreement with Nez Perces Indians, in Idaho	1,668,622.00
For expenses under agreement with the Yuma Indians, in California	5,000.00
	2,597,067.79

REDUCTIONS.

For annuity to Shawnees	5,000.00
For pay of superintendent North Carolina Indian school	200.00
	5,200.00
Net increase	2,591,867.79

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 514.

IN THE SENATE OF THE UNITED STATES.

JULY 11, 1894.—Ordered to be printed.

Mr. PEFFER, from the Committee on Claims, submitted the following

REPORT:

[To accompany S. 1274.]

The Committee on Claims, having had under consideration the bill (S. 1274) for the relief of Henry J. Hewitt, respectfully report as follows:

The facts in the case are set out in House Report No. 268, Fifty-first Congress, first session, when the Committee on War Claims reported favorably. That report was adopted as part of the report of the Committee on War Claims of the House of Representatives of the Fifty-second Congress (*see* House Report No. 2157, Fifty-second Congress, second session) and again by the same committee of the Fifty-third Congress, second session (*see* House Report No. 576), all of which are hereto attached and made part of this report.

Your committee will add that there appears to be an equity in this case arising out of laches for which the claimant was not responsible. He appears to have acted in good faith, and in view of the facts in relation to the status of the claimant and the use to which at least part of his property was applied, the committee see no reason why he should not have an opportunity to present his case to the proper officers for investigation and report.

Your committee therefore recommend the passage of the bill.

[House Report No. 576, Fifty-third Congress, second session.]

The Committee on War Claims, to whom was referred the bill (H. R. 3337) for the relief of Henry J. Hewitt, submit the following report:

This claim was presented in the Fifty-second Congress, and was favorably reported upon by the House Committee on War Claims, to whom it was referred.

After a careful investigation of the facts involved, your committee adopt the report of the Fifty-second Congress, a copy thereof being hereto attached and made a part of this report, and recommend that the bill do pass.

[House Report No. 2157, Fifty-second Congress, second session.]

The Committee on War Claims, to whom was referred the bill (H. R. 4096) for the relief of Henry J. Hewitt, submit the following report:

The facts out of which this bill for relief arises will be found stated in House report from the Committee on War Claims of the Fifty-first Congress, hereto annexed and made a part of this report.

Your committee adopt the said report as their own, and report herewith a substitute for the bill and recommend its passage.

[House Report No. 268, Fifty-first Congress, first session.]

The Committee on War Claims, to whom was referred the bill (H. R. 1849) for the relief of Henry J. Hewitt, report as follows:

The affidavits of the claimant, Henry J. Hewitt, and 10 other persons, several of them ex-Union officers and soldiers, and 2 or 3 of them employés of claimant in carrying the United States mails during the years 1862, 1863, 1864, and 1865, show that a large quantity of forage and several horses and wagons belonging to claimant were taken by the United States military authorities in northern Missouri during the years named. It also appears that at the time this forage and these horses and wagons were taken the claimant was a subcontractor for carrying the United States mails in northern Missouri and southern Iowa, one of these mail routes being No. 10481, and it is alleged by claimant in his affidavit that this personal property, so taken, was purchased by him for the purpose of fulfilling his contract in carrying the United States mails over the several mail routes.

The affidavits also allege that the hotel, storehouse, and barn owned by claimant at Macon City, Mo., and the barn owned by him at Lancaster, Mo., were occupied during the years above named by the United States military forces.

It also appears from the evidence on file that very soon after the war the claimant placed his claim in the hands of A. Slingerland, clerk of the court of Adair County, Mo., for the purpose of having it filed in the proper Department and prosecuted; that a short time subsequent thereto Mr. Slingerland went to Colorado on a visit for the benefit of his impaired health, and while there he died; that the claimant supposed that his claim had been properly filed by Mr. Slingerland in his lifetime, and did not learn to the contrary until long after his death and too late to file the same in the proper Department.

Your committee believe that this delay in presenting this claim was not due to any laches on the part of the claimant, and that in view of the allegation that the articles taken were purchased by him for the purpose of fulfilling his contract to carry the United States mails, he should in all equity have the same opportunity as other loyal claimants have heretofore had to establish the justice of his claim.

Your committee are therefore of the opinion that the claim of Henry J. Hewitt should be investigated by the Quartermaster's Department, U. S. Army, as other claims of this character have heretofore been investigated.

They accordingly report herewith a bill as a substitute for the bill H. R. 1849, and recommend that the same do pass.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 515.

IN THE SENATE OF THE UNITED STATES.

JULY 11, 1894.—Ordered to be printed.

Mr. MCMILLAN, from the Committee on Naval Affairs, submitted the following

REPORT:

[To accompany S. 1464.]

The Committee on Naval Affairs, having had under consideration the bill (S. 1464) for the relief of certain enlisted men in the Marine Corps of the U. S. Navy, recommend immediate passage of the bill.

The bill having been referred to the Navy Department for examination and report, the Secretary of the Navy urges the passage of the bill as a measure of justice to marines who lost their own property while engaged in an attempt to protect the property of the Government. The communication of the Secretary, and the General Order, No. 419, which are appended, give a full history of the matter.

NAAY DEPARTMENT,
Washington, June 28, 1894.

SIR: I have the honor to acknowledge the receipt of Senate bill 1464, for the relief of certain enlisted men of the Marine Corps, upon which you request information, and in reply I have to inform you that it appears from the files of this Department that all precautions were taken to preserve both the Government and individual property of the people on duty at the naval station, Port Royal, S. C., on the night of August 27, 1893, when the cyclone occurred which did great damage to the property at the station. It further appears that the marines for whose relief the within bill is intended were engaged in an attempt to protect Government property, and were, therefore, unable to save their private effects, which were swept away by the waters.

The commandant of the naval station, in a letter to the colonel commandant of the Marine Corps, commented highly upon the action of the marines upon this occasion, and their conduct formed a part of a general order issued by the Navy Department upon this subject, a copy of which is inclosed for your information.

The within-mentioned bill is intended simply to reimburse them in an amount equal to the actual loss which each sustained at that time, and, in view of the manner in which their clothing was lost, and of their subsequent actions, the Department recommends this bill to the favorable action of the Committee on Naval Affairs.

Very respectfully,

H. A. HERBERT,
Secretary of the Navy.

Hon. JAMES MCMILLAN,
Naval Affairs Committee, U. S. Senate.

GENERAL ORDER } NAVY DEPARTMENT,
No. 419. } *Washington, September 23, 1893.*

The cyclone which recently swept over the southern Atlantic seaboard, carrying devastation and ruin in its path, visited the U. S. naval station at Port Royal, S. C., on the 27th and 28th of August last, with unusual severity, destroying life and doing great damage to property, both within the precincts of the station and in the surrounding country, and leaving without food or shelter numbers of families of enlisted men of the Navy and employés in the service of the Government and others.

In view of the fury and duration of the storm, with the attendant loss of life and property, and the courage and fortitude displayed by those who were unfortunately exposed to its violence, it is deemed proper that a public acknowledgment be made of the important service rendered by officers and enlisted men of the Navy and employés of the naval station at Port Royal on that occasion.

But for the prompt measures adopted by Capt. L. A. Beardslee, U. S. Navy, commandant of that station, to meet the dangers of the emergency when the island on which the naval station is situated was inundated by the sea in the midst of the storm, and the invaluable assistance, so cheerfully rendered by the ladies of the families of the two officers residing on the island, in providing shelter, food, and clothing for the homeless and destitute, and in caring for and alleviating the sufferings of the sick and injured in this demoralized community, the misery following in the track of the hurricane would have been even more widespread than it was.

It appears from a report concerning this storm, made to the Department by Capt. Beardslee, that a most deplorable consequence of its fury was the death by drowning of Dr. W. G. Hazel, apothecary, an old and faithful servant of the Government, whose death in a gallant attempt to save others exemplifies his character, as shown during his long and useful career.

Israel Elliot, commandant's steward, and John Broadanax, commandant's cook, during the height of the hurricane, waded up to their necks in the fierce sea which swept the island to a falling house, and with a lighter which they with others had secured, rescued from drowning about 20 women and children, and landed them in a place of safety. Middleton Grayson, coxswain; Jerry Green, landsman; Laurence Green, landsman, and Peter Brown, first-class fireman, stayed by the steam launches in which they were stationed, endeavoring to save them, until they narrowly escaped going down in them.

The conduct of the marine guard, in charge of First Sergt. Michael Gallager, was most praiseworthy. When the island was inundated the marines waded to and fro through the flood, which was driven by the wind into seas so dangerous that many people were overthrown and drowned by them, doing their utmost to preserve life and property.

The same report of the calamity shows that valuable assistance was rendered on this occasion by Civil Engineer George Mackay, Surg. H. C. Babin, Messrs. G. B. Stratton, Juan Jeminez, J. Hardin Jones, Emil Diebitch, J. H. Disher, machinist, and L. L. Bennett, landsman, and that they, with the force of enlisted men at the station and the Government employés without exception, behaved admirably, and were untiring in their efforts to render assistance to those in danger and to rescue property from destruction in many cases at great personal risk.

Where devotion to duty is so general, and the response to the appeals of the unfortunate victims of the disaster so prompt and efficient, it is difficult to select any individual for especial commendation, but to all those whose names are mentioned in this general order the thanks of the Department are hereby tendered.

H. A. HERBERT,
Secretary of the Navy.

53D CONGRESS, 2d Session. } SENATE. { REPORT No. 516.

IN THE SENATE OF THE UNITED STATES.

JULY 11, 1894.—Ordered to be printed.

Mr. MCMILLAN, from the Committee on Naval Affairs, submitted the following

REPORT:

[To accompany S. 1535.]

The Committee on Naval Affairs, to whom was referred the bill (S. 1535) to correct the naval history of John C. Dull, after consideration, recommend the passage of the measure.

In 1847, John C. Dull, at the age of 18, entered the Navy as a landsman for three years. He served on the *Ontario*, the *Franklin*, and the *Etna*. After seventeen months of service he deserted from the *Etna*, off Frontera, Mexico, June 3, 1848. These facts appear on the records of the Bureau of Navigation, Navy Department, and in the office of the Fourth Auditor of the Treasury.

Hon. B. F. Tracy, then Secretary of the Navy, in a letter to Hon. Hilary A. Herbert, then chairman of the House Committee on Naval Affairs, under date of March 11, 1892, says:

> In view of the fact that Dull was a minor at the time of his enlistment and of his desertion, and that prior to the date of his desertion hostilities had ceased and the treaty of peace between Mexico and the United States had been concluded and ratified, the Department perceives no objection to the favorable action of Congress upon the bill to correct his naval history.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 517.

IN THE SENATE OF THE UNITED STATES.

JULY 11, 1894.—Ordered to be printed.

Mr. MCMILLAN, from the Committee on Naval Affairs, submitted the following

REPORT:

[To accompany S. 1083.]

The Committee on Naval Affairs, to whom was referred the bill (S. 1083) for the relief of the estate of John Ericsson, after due consideration, make a favorable report thereon.

Bills identical with this have received favorable reports in various Congresses, and some of them have passed the Senate.

In 1839 Congress took up the question of a new navy, and by three acts passed within two years authorized the expenditure of $745,000 for the construction of 3 steam vessels of war, on such models as should be most approved according to the best advices the President and the Secretary of the Navy could obtain.

Capt. Stockton, who was very much interested in the project of reconstructing the Navy, had an idea that the new vessels should be built with their engines and machinery entirely out of the reach of shot. While in England in search of information, Capt. Stockton was told by Francis P. Ogden, then consul of the United States at Liverpool, that an ingenious mechanic named John Ericsson had given a great deal of time and attention to the subject of submerged wheels. Capt. Stockton met Ericsson and had the latter construct models of an iron boat with submerged wheels, and also of an engine which could be so placed in a vessel as to be below the water line. With these models Capt. Stockton returned to the United States, and in 1841 he was commissioned to superintend the construction at Philadelphia of the steamship *Princeton*, according to designs that he himself should furnish.

While undecided as to whether he should undertake the task, or at least dissatisfied with his assignment, Capt. Stockton received a letter from Ericsson, who had come to New York. Although at first surprised and not altogether pleased with the young engineer's reappearance, Capt. Stockton put himself in communication with Ericsson and set him at work on drawings for a 600-ton ship. For fourteen months Ericsson worked on the drawings for and superintended the construction of a double semicylindrical engine on an entirely new plan; a submerged propeller, boilers, a telescopic chimney, with mechanism for raising and lowering, and also centrifugal blowers for increasing the furnace draft and apparatus for utilizing heat from waste steam, besides carriages, friction gear and self-acting locks for the guns, and many other minor items.

After the vessel was completed, Ericsson sent to the Navy Department a bill for $15,080 for services rendered during fourteen months, at $25 a day for the time actually employed. This sum included traveling and office expenses, together with draftsman's pay. The bill was referred to Capt. Stockton, who disapproved it. His explanation was that he had an agreement with Ericsson by which the latter was to have his patents used on the *Princeton*, and if they were successful the advertisement which he would gain by their use on a war vessel would compensate him for his labor and services beyond the $1,150 allowed him for expenses. It was agreed between the two, as Capt. Stockton recites, that Ericsson should accept whatever a grateful Congress might allow him for his inventions. Feeling that he had rendered a moderate bill, which should have been promptly paid by the Navy Department, Ericsson introduced testimony to show the success of the vessel in the construction of which he had so large a share.

A committee of the American Institute reported that—

> The *Princeton* is a sublime conception, most successfully realized; an effort of genius skillfully executed; a grand, unique combination, honorable to the country and creditable to all engaged upon her. Nothing in the history of mechanics surpasses the inventive genius of Capt. Ericsson, unless it be the moral daring of Cap. Stockton in the adoption of so many novelties at one time.

The *Princeton* seemed to be all that was expected of her. Capt. Stockton, her commander, reported that small as she was, she was able to battle with any vessel however large, if indeed she was not invincible against any foe; and for the improvements adopted in her build he foresaw "more important results than had occurred since the invention of gunpowder."

The fact that the *Princeton* was able to sail with any vessel of her class, and yet have auxiliary steam power sufficient to attain a speed of about 14 knots made her one of the notable vessels of the Navy. That the *Princeton* eventually proved a failure was not Ericsson's fault. In a letter from the Secretary of the Navy, transmitting the report of a board of engineers as to the causes of failure of certain steamers of the U. S. Navy (Mis. Doc. No. 2, Thirty-third Congress, first session), it is stated by the board that—

> The principal cause of the failure of this vessel they conceived to be in the plan and arrangement of the boilers, the consumption of fuel being very great in proportion to the result obtained. As to the engines, they were of the opinion that the substituting a "Sickel's cut-off" for the original slide-valve cut-off was a very injudicious alteration of these engines; and, in fact, that all the important alterations of the engines *from the original arrangement* have been highly injudicious.

On the 28th of February, 1844, while the *Princeton* was taking a party down the Potomac, one of her wrought-iron guns exploded, killing Hon. Abel P. Upshur, the Secretary of State; Hon. Thomas W. Gilmer, Secretary of the Navy, and 3 other members of the party, and wounding 16 or 20 people. Although the vessel afterwards saw some service in the Mediterranean, after having been twice rebuilt she was broken up in 1849, after an existence of but eight years.

In 1856, fourteen years after Ericsson's services were rendered, Congress sent his claim to the Court of Claims, which court unanimously found that the sum of $13,930 was due him for his labors; yet to this day no appropriation has been made to pay that debt.

Keenly humiliated by such treatment, Ericsson, after having invented the *Monitor*, of which the *Princeton* was the precursor, refused to come to Washington to submit his plans to the Navy Department, and when his designs were submitted by others they met with such serious official

objection that the *Monitor* was built by private capital, the Government agreeing to repay the expenditure only in the event of success.

The Navy Department board of construction is now experimenting with the Ericsson system of submarine artillery, a fact which shows how great and far-reaching have been the inventions of the man whom chance brought to this country over half a century ago.

The bill now under consideration has for its object to pay a claim that has been passed upon favorably by the Court of Claims, and the withholding of this comparatively small sum from those who have been entitled to it for a third of a century is not creditable to the Government of the United States.

The finding of the Court of Claims, together with a letter from the Secretary of the Navy certifying that the claim has never been paid, are appended.

[From H. R. Reports Court of Claims, 1856–'57.]

After stating the preliminary facts, much as herein stated, the court concludes its opinion as follows:

On the 14th day of March, A. D. 1844, the petitioner presented his claim (Schedule A) for compensation for services to the Secretary of the Navy, and on the 11th day of May, A. D. 1844, it was rejected, on the ground that Capt. Stockton, in a letter to the Secretary of the Navy, had stated as follows: "In regard to Capt. Ericsson's bill, which was sent to me at the same time, I must say that, with all my desire to serve him, I can not approve his bill; it is in direct violation of our agreement as far as it is to be considered a legal claim upon the Department." (*See* Schedule F of Exhibit A.)

In a subsequent letter from Capt. Stockton to the Secretary of the Navy, he further stated: "That it has given me great pleasure to acknowledge, upon all proper occasions, the services of Capt. Ericsson's mechanical skill in carrying out my well-intended efforts for the benefit of the country." * * * "I have invariably given him to understand in the most distinct manner whenever the subject was alluded to that I had no authority from the Government to employ him, and that if he received anything that it must be altogether gratuitous on the part of the Government; that, considering the great opportunity that he, as an inventor, would have to introdnce his patent to the world by the aid of the funds of the Government, I did not think it proper for him to make a charge for their application to the *Princeton;* in all of which he has concurred, as far as I know, up to the time of the presentment of his extraordinary bill." (*See* BB of Exhibit A.)

In a letter from Capt. Stockton to the petitioner, written in July, A. D. 1841, he says: "In making up the estimate for the cost of the ship it will be necessary to consider what must be put down for the use of your patent right. It will be necessary, therefore, for you to write me a letter stating your views on that subject. As a great effort has been made to get a ship built for the experiment, I think you had better say to me in your letter that your charge will hereafter be (if the experiment should prove successful) ———; but, as this is the first trial on so large a scale, I am at liberty to use the patents, and, after the ship is tried, Government may pay for their use in that ship whatever sum they may deem proper." In reply to this letter the petitioner, in a letter to Capt. Stockton dated the 28th day of July, A. D. 1841, said: "I have duly received your communication on the subject of my patent right for ship propeller and semicylindrical steam engine, in reply to which I beg to propose that, in case these inventions should be applied to your intended steam frigate, all considerations relating to my charge for said patent right be deferred until after the completion and trial of the said patent propeller and steam machinery. Should their success be such as to induce Government to continue the use of the patents for the Navy, I submit that I am entitled to some remuneration; but, considering the liberality that thus enables me to have the utility of the patents tested on a very large scale, and the advantages which can not fail to be derived in consequence, I beg to state that whenever the efficiency of the intended machinery of your steam frigate shall have been fully tested, I shall be satisfied with whatever sum you may please to recommend, or the Government see fit to pay, for the patent right." (*See* Nos. 12 and 13 of Exhibit A.)

In a letter from Capt. Stockton to the Secretary of the Navy, dated February 7, A. D. 1853, he refers to his letter of May 20th, A. D. 1844, and, amongst other things, says: "In that letter I stated the nature of Capt. Ericsson's services, and the extent of the Department's obligation to him, and admitted his claim to such compensation from the Government as, under the circumstances, he may be entitled to.

"Time and reflection have not diminished, but rather increased, my estimate of the nature of Capt. Ericsson's services, and I have now the honor to reiterate my former opinion, and further to say that the Government should make him a fair and reasonable compensation for his time and expenses while engaged in superintending the construction of the *Princeton's* machinery, etc."

The services rendered by the petitioner were reasonably worth the amount charged by him, to wit, the sum of $15,080. (*See* the deposition of Charles W. Copeland.)

The question now presented for our consideration is, whether, under these circumstances, the petitioner is entitled to relief. He has shown that it had been determined by the proper authority, in pursuance of law, to build the steamer *Princeton*, and that to effect that object on the plan proposed, and on which she was in fact constructed, the very services rendered by the petitioner to be performed either by him or some other person were indispensable. It is insisted, however, that the services of the petitioner were rendered gratuitously. If this be true, then the petitioner's claim can not be sustained.

In support of the proposition that the petitioner's services were rendered gratuitously, it is urged (1) that he was not employed by any person duly authorized to employ him, and (2) that the testimony of Capt. Stockton is direct and positive that they were thus rendered. *Nemo præsumitur donare*, and this maxim applies with great force to a case like the present, where the object on which the bounty is to be bestowed is a great and powerful government in possession of abundant means for all its legitimate purposes.

That the determination to build the steamer *Princeton* precisely on the plan on which she was built was made by the proper authority, under an adequate appropriation, is not disputed, and is in fact indisputable. It is equally clear that it was not expected that her construction could be effected without an outlay of money. In order to carry out the object contemplated, it was necessary to employ proper agents and to invest them with the authority requisite for the purpose. Accordingly we find the Secretary of the Navy giving orders to Capt. Stockton to superintend the building of the steamer, under the direction of the commandant of the navy-yard at Philadelphia, and to make to him from time to time during the progress of the work such suggestions as he might think proper. If, then, this order was obeyed, she was lawfully built, and everything done in connection with her construction was lawfully done.

That the petitioner rendered the services for which he claims compensation is undisputed; but it is insisted that if Capt. Stockton had no authority to make such a request so as to entitle the petitioner to compensation, except under the direction of the commandant of the navy-yard at Philadelphia, he was guilty of a violation of duty. And, moreover, if this direction was essential to the validity of such a request, then it was also essential to authorize Capt. Stockton to accept the services of the petitioner, though tendered to him gratuitously. But it is to be presumed that Capt. Stockton, in all that he did, acted in the line of his duty and not in violation of it. No complaint has ever been made against him by the Government, whose agent he was, but, on the contrary, the payment of the petitioner's claim was made by the very authority under which Capt. Stockton acted, to depend upon his report. It must be intended, therefore, that in making the request on which the petitioner's services were rendered he acted by proper authority. If the direction of the commandant at the navy-yard at Philadelphia were necessary, it will be presumed the Secretary of the Navy himself, in rejecting the petitioner's claim, recognized Capt. Stockton as the trusted and duly authorized agent of the Government in the premises. There is, then, no room for question that what the petitioner did was lawfully done and that his services were rendered at the request of an officer duly authorized to make it. He did not officiously intermeddle with the great public work which was going on. It would, indeed, be a most offensive imputation upon the characters of the honorable men under whose superintendence and direction it was carried on and completed, even to suppose that he could have done so if he had desired. The only point of inquiry, therefore, is, did the petitioner render his services gratuitously?

The letter from Capt. Stockton to the Secretary of the Navy of the 20th of May, A. D. 1844, is explained by his letter to the same officer of the 7th of February, A. D. 1853. If we take the former according to its strict literal interpretation Capt. Stockton may be understood not only as having denied that he had any authority to employ the petitioner, but also as having asserted that the petitioner volunteered his services and rendered them gratuitously. But he did not mean either the one or the other, as is apparent from the consideration that if he did the two letters would be in conflict with each other. In his letter of the 7th of February, A. D. 1853, he

expressly says that in his letter of the 20th of May, A. D. 1844, he stated "the nature of Capt. Ericsson's services and the extent of the Department's obligation to him, and admitted his claim to such compensation from the Government as under the circumstances he may be entitled to." He meant, therefore, in his letter of May 20, 1844, not only to state an obligation of some kind on the part of the Navy Department to the petitioner, but also to state the extent of that obligation by admitting that he is entitled to a reasonable compensation for his services. But this is wholly inconsistent with the idea that those services were rendered gratuitously. The first letter, therefore, is not to be literally interpreted. It may not be proper here to add that the letter of the 7th of February, A. D. 1853, was obviously designed to be explanatory of the former letter; and to remove all doubt as to his meaning he in conclusion says: "Time and reflection have not diminished, but rather increased, my estimate of Capt. Ericsson's services, and further to say that the Government should make him a fair and reasonable compensation for his time and expenses while engaged in superintending the construction of the *Princeton's* machinery, etc."

With the first letter thus explained, the whole case is relieved from difficulty. If the Secretary of the Navy, when he received that letter, had understood it according to this explanation, he would not have rejected the petitioner's claim. When Capt. Stockton wrote the letter of May 20, A. D. 1844, he was manifestly under the impression that the plaintiff was asserting a special contract for specified services at a fixed price, and he meant to state not only that no such contract had been made, but that he had no authority to make it. It is to such a contract that the whole of the first letter refers. We can very well understand that the petitioner would gladly have availed himself of such an opportunity "to exhibit to the whole world the importance of his various patents," and that to secure it he would have permitted his compensation to depend on the contingency of their success; but we do not suppose that Capt. Stockton or anyone else desired that if the result should be entirely successful the United States should receive the benefit of the petitioner's services without compensation. Taking the two letters of Capt. Stockton together, we have no difficulty in coming to the conclusion that the understanding between the petitioner and Capt. Stockton was that the petitioner should be permitted "to exhibit to the world the importance of his various patents" in his own way, according to his own plans, and that he should receive just such compensation for his services as should be justified by the result. The petitioner agreed to accept a *quantum meruit*, dependent on the success of his labors.

The petitioner admits the receipt of $1,150. He claims $15,080. We shall report to Congress a bill in his favor for the sum of $13,930.

NAVY DEPARTMENT,
Washington, June 30, 1894.

SIR: Referring to Senate bill 1083 "for the relief of the estate of John Ericsson," transmitted by your indorsement of the 26th instant for examination and report, I have the honor to inform you that the files of this Department contain no record of any payment having been made to John Ericsson, or his personal representatives, in compliance with the judgment of the Court of Claims referred to in said bill.

Very respectfully,

Hon. JAMES MCMILLAN,
Committee on Naval Affairs, U. S. Senate.

H. A. HERBERT,
Secretary of the Navy.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 518.

IN THE SENATE OF THE UNITED STATES.

JULY 11, 1894.—Ordered to be printed.

Mr. HALE, from the Committee on Naval Affairs, submitted the following

REPORT:

[To accompany H. R. 38.]

The Senate Committee on Naval Affairs adopt the following report:

The Committee on Naval Affairs, to whom was referred the bill (H. R. 38) relating to the pay and retirement of mates in the Navy, having duly considered the same, submit the following report:

The passage of the act of July 15, 1870, stopped the further appointment of acting masters' mates or mates in the U. S. Navy. It left the mates already in the Navy on duty, and they are carried on the Navy Register to-day. They were appointed under the act of July 24, 1861. Section 2 of the act of March 3, 1865, provided that acting masters' mates should be styled mates, and authorized an increase of their pay to a sum not exceeding $60 per month. The naval appropriation bill of July 15, 1870, section 3, fixed the pay of mates as follows:

	Per annum.
Sea pay	$900
Shore-duty pay	700
Leave or waiting-orders pay	500

The act of July 2, 1864, designated boatswains, engineers, carpenters, and sailmakers as warrant officers, and under sections 1448 and 1455, Revised Statutes, they are retired the same as commissioned officers. Under existing law mates who were left in the service are not classed as either commissioned or warrant officers, and, therefore, can not receive the benefits of the laws providing for the retirement of officers of the Navy. There are now 27 of these old mates in the naval service. They have served from twenty-five to over forty years in the Navy as acting masters, acting ensigns, and mates. They are all getting old and have families to support. Their ages are from 50 to 65 years. The best days of their lives have been spent in the Navy. They ask only for the benefit of the retired list the same as all other officers and enlisted men. Secretaries Chandler, Whitney, Tracy, and Herbert have all favored the passage of the bill and it has been repeatedly reported favorably in both the House and Senate.

The following is a list of the mates now in the Navy, with their ages and total length of service in the Navy, Army, and Marine Corps as acting ensigns, mates, and in other ratings to March, 1894:

No.	Names.	Age.	Years of service as shown in Navy Register.	Years of service not credited in Navy Register.	Total years service.
1	James W. Baxter	54	45	.....	45
2	W. W. Beck	66	32	.....	32
3	Thomas W. Bonsall	58	29	.....	29
4	William Boyd	58	27	.....	27
5	A. F. Callender	48	24	3	27
6	C. H. Cleaveland	52	30	.....	30
7	J. M. Creighton	47	27	.....	27
8	H. C. Fuller	55	30	.....	30
9	L. B. Gallagher	48	24	6	30
10	Samuel Gee	56	24	12	36

No.	Name.	Age.	Years of service as shown in Navy Register.	Years of service not credited in Navy Register.	Total years service.
11	John Griffin	60	33	.....	33
12	James Hill	55	24	6	30
13	Frank Holler	61	27	6	33
14	William Jenney	58	30	.....	30
15	Hugh Kuhl	58	33	.....	33
16	L. M. Melchor	45	26	3	29
17	C. J. Murphy	52	29	4	33
18	Harold Neilson	54	23	10	33
19	Benjamin G. Perry	70	28	9	37
20	Robert Robinson	54	32	4	36
21	J. A. Smith	54	32	.....	32
22	S. T. C. Smith	49	28	.....	28
23	William G. Smith	55	36	.....	36
24	C. H. Thorne	56	30	3	33
25	P. C. Van Buskirk	62	24	8	32
26	John L. Vennard	55	29	.....	29
27	Charles Wilson	57	28	8	36

Twenty-seven years' service	3
Twenty-seven to thirty-two years' service	12
Thirty-two to thirty-seven years' service	11
Forty-five years' service	1
	27

These mates have always taken precedence of warrant officers, who, under the law, are entitled to be placed on the retired list. There is no reason why this distinction should be made.

The following is an extract from the report of the Committee on Naval Affairs of the Fifty-first Congress, submitted by Mr. Boutelle:

"By the act of July 24, 1861 (12 Stat. L., 272), certain appointments for the temporary increase of the Navy, including those of masters' mates, were authorized and ratified. Section 2 of the act of March 3, 1865 (13 Stat. L., 539), 'to increase the pay of midshipmen and others,' provided that acting masters' mates should be styled 'mates,' and authorized an increase of their pay to a sum not exceeding $60 per month.

"The naval appropriation bill of July 15, 1870 (16 Stat. L., 330), section 3, fixed the pay of mates as follows: Sea pay, $900; shore duty pay, $700; leave or waiting order pay, $500. This provision is now embodied in section 1556, Revised Statutes. The same act having repealed, except as to assistant surgeons, the authority for the appointment of temporary or acting officers in the Navy, there have been, since the passage of the act of July 15, 1870, no further appointments of acting masters' mates, or mates, nor has there been since then any change in the status or pay of mates in the Navy.

"The act of July 2, 1864, now section 1406, Revised Statutes, designates boatswains, gunners, carpenters, and sailmakers as 'warrant officers,' and under sections 1448–1455, Revised Statutes, they may be retired the same as commissioned officers.

"Under existing law, however, mates are not classed as commissioned or warrant officers, and therefore can not receive the benefit of the laws providing for the retirement of officers of the Navy.

"Section 1408, Revised Statutes, authorizes the Secretary of the Navy, should the exigencies of the service so require, to cause seamen and ordinary seamen who have enlisted for not less than two years to be rated as mates, with the pay now provided by law for that grade; but that provision would not be affected by this bill, the operation of which is confined to the mates now in the service.

"By section 1556, Revised Statutes, the pay of 'warrant officers,' i. e., boatswains, gunners, carpenters, and sailmakers, is fixed as follows:

Term of service.	At sea.	On shore duty.	On leave or waiting orders.
First three years after date of appointment	$1,000	$900	$700
Second three years after date of appointment	1,300	1,000	800
Third three years after date of appointment	1,400	1,300	900
Fourth three years after date of appointment	1,600	1,300	1,000
After twelve years from date of appointment	1,800	1,600	1,200

"As all the mates now in the service have served more than twelve years since the date of their appointment, their pay will be increased by this bill to $1,800 sea pay, $1,600 shore duty, $1,200 leave or waiting orders.

"It will be borne in mind that although the mates take precedence of warrant officers in line of duty their pay has always been much less, and they have been entirely deprived of the increase of pay for longevity of service which is given to all other officers.

"The committee find that some of these mates have been in the service upward of forty years as enlisted men or officers; that nearly all of them were appointed and served in the Navy during the late war, while some were in the service in the Mexican war, and that many of them have performed the duties of commanding, executive, and deck officers, intrusted with the responsibilities that would be imposed upon ensigns and lieutenants. Their efficiency and usefulness is attested most cordially in memorials presented to the committee bearing the signatures of Admiral Porter, Vice-Admiral Rowan, Rear-Admirals Jenkins, Worden, Rodgers, Nichols, Patterson, Walke, Clitz, Leroy, and Rhind, Commodore Harmony, and many other of the foremost officers of the Navy, who earnestly favor the placing of the mates on the same footing as the warrant officers, as do the last and the present Secretary of the Navy.

"In view of the long, faithful, and valuable service of these men, some of whom are now on the leave or waiting-orders pay of $500 per year, the committee believe that it will be but simple justice to grant them the benefits of longevity pay and of the retired list now enjoyed by warrant officers, and therefore recommend that bill H. R. 3301 do pass, with the following amendments:

"As one of the mates has died since this bill was introduced, amend by striking out the word 'four' in line 5, and insert the word 'three' so that it will read 'thirty-three officers,' etc. Also amend by striking out all of section 2 and insert as an addition to section 1 the following proviso:

"'*Provided, however*, That nothing herein contained shall be so construed as to authorize any increase of pay for any time prior to the passage of this act.'"

The case is very clearly stated in Senate report 548 made to the Fifty-second Congress, first session, by Senator Chandler, formerly Secretary of the Navy. It says:

"Bills providing for the retirement of mates in the Navy, and the regulation of their pay, have been favorably reported in the Fiftieth and Fifty-first Congresses, and justice to this small but efficient corps demands that action should be no longer delayed. When the first bill was reported the number of mates was only 33, and that number has dwindled down to 28. Of these 1 has served forty-three years, 14 over thirty years, and 13 over twenty years each. Most of them are well advanced in years and have families dependent upon them. Nearly all served during the late war, and some during the Mexican war.

"The pay of mates while on sea duty is $900 per year, on shore duty $700, and on leave or waiting orders $500. Of the 28 mates, 22 are on shore duty, 1 is on waiting orders, and only 5 are on sea service. They take precedence of warrant officers in line of duty, and yet the warrant officers are paid for the first three years' service $1,200 per year while on sea duty and $900 while on shore duty, and those amounts are increased every three years until after twelve years' service, when they receive $1,800 for sea and $1,600 for shore duty. With equal duties, equal mess expenses, and equal responsibilities, and with over twenty years' service every mate should now be receiving the highest amount paid to any warrant officer—$1,800 per year for sea duty, $1,600 for shore duty, and $1,200 while waiting orders. The bill which this report accompanies provides for paying them only $1,200 for sea and $900 for shore duty, and $700 while waiting orders. This proposition is far from being an extravagant one, especially when it is considered that these veteran mates, who have suffered from injustice for years, are constantly diminishing in numbers and in a short time will all be gone. The final amendatory clause of the bill as reported authorizes the Secretary of the Navy in his discretion to place any of the mates upon the retired list, and it is probable that most of them will at an early day be so disposed of.

"As to the propriety of allowing these officers longevity pay, there can be but one opinion. They are morally as much entitled to it as any other officers of the Navy. It should have been given to them in the act of 1870, by which it was granted to all naval officers except them. The reason for the neglect was probably that, being a small and inadequately paid corps, they did not assert themselves as forcibly as they might, while the understanding that no more appointments were to be made caused less attention to be paid to them than otherwise would have been the case. But whatever the reason, they were overlooked, and it remains for Congress to repair the mistake and to give these mates the benefit of a retired list as allowed to other naval officers.

The feeling in the Navy concerning the bill is shown in the following letter:

WASHINGTON, D. C., *July 1, 1886.*

To the Naval Committees of the Senate and House of Representatives:

HON. SIRS: The mates of the Navy are efficient officers, having performed the duties of commanding, executive, and deck officers for many years, some having served upward of forty years as enlisted men and officers.

Nearly all served in the U. S. Navy during the late war, and some were in the service during the Mexican war.

They have the same uniform, mess bill, and other expenses that warrant officers have, and in line of duty take precedence of warrant officers.

They are the only ones who do not receive longevity pay, and should receive the same as warrant officers, and also the benefits of the retired list as now allowed to all other officers.

DAVID D. PORTER, Admiral.
S. C. ROWAN, Vice-Admiral.
THORNTON A. JENKINS, rear-admiral.
JOHN L. WORDEN, rear-admiral.
C. R. P. ROGERS, rear-admiral.
E. T. NICHOLS, rear-admiral.
T. H. PATTERSON, rear-admiral.
HENRY WALKE, rear-admiral.
J. M. B. CLITZ, rear-admiral.
WM. E. LEROY, rear-admiral.
A. C. RHIND, rear-admiral.
D. B. HARMONY, commodore.
W. W. QUEEN, commodore.
L. A. KIMBERLY, commodore.
RALPH CHANDLER, commodore.
D. L. BRAINE, commodore.
W. T. TRUXTON, commodore.
MONTGOMERY SICARD, captain.
R. R. WALLACE, captain.
GEO. C. REMEY, captain.
J. FYFFE, captain.
ALBERT KAUTZ, captain.
R. L. LAW, captain.
GEO. BROWN, captain.
J. N. MILLER, captain.
M. HAXTON, captain.
A. P. COOK, captain.
S. CASEY, commander.
A. H. MCCORMICK, commander.
J. H. SANDS, commander.
A. G. KELLOG, commander.
M. L. JOHNSON, commander.
H. B. SELLY, commander.
THEODORE F. KANE, commander.
J. C. WATSON, commander.
H. B. ROBESON, commander.
WM. WHITEHEAD, commander.
GEO. W. COFFIN, commander.
P. F. HARRINGTON, commander.
C. M. SCHOONMAKER, commander.
C. S. COTTON, commander.
C. M'GREGER, commander.
JOHN M'GOWAN, lieutenant commander.
GEO. M. BOOK, lieutenant-commander.
GEO. N. TOTTEN, lieutenant-commander.
C. A. SCHETKY, lieutenant-commander.
JAS. M. FORSYTH, lieutenant-commander.
O. W. FARENHOLT, lieutenant-commander.

I concur in the representation made in this communication.

WM. E. CHANDLER.

Confident that the Government owes this act of justice to these veterans in the service, your committee respectfully recommend the passage of this bill.

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53D CONGRESS, 2d Session. } SENATE. { REPORT No. 519.

IN THE SENATE OF THE UNITED STATES.

REPORT

OF

COMMITTEE ON COMMERCE,

U. S. SENATE

ON THE

BILL (H. R. 6518) MAKING APPROPRIATIONS FOR THE CONSTRUCTION, REPAIR, AND PRESERVATION OF CERTAIN PUBLIC WORKS ON RIVERS AND HARBORS, AND FOR OTHER PURPOSES.

[To accompany the bill H. R. 6518.]

JULY 11, 1894.—Reported by Mr. RANSOM from the Committee on Commerce and ordered to be printed.

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HARBOR AT CAMDEN, ME.

This harbor is located on the west shore of Penobscot Bay, about 8 miles from Rockland.

The village of Camden has about 3,000 inhabitants, many of whom are engaged in shipbuilding and kindred industries. The steamers between Boston and Bangor touch regularly at Camden, making about 500 arrivals of steamers annually.

Before the present improvement was begun the harbor was so shoal that at low water vessels drawing more than 6 feet could not reach the wharves.

The project, adopted in 1888, provides for dredging the approaches to a depth of 12 feet, and the channels to a depth of 10 feet, and removing the middle ground.

The amount hitherto expended on this project is $18,000. As a result, the west channel had been dredged to a depth of 10 feet at mean low tide throughout its entire length, including the approach, the latter to a width of 125 feet, and the channel itself to a width of 100 feet.

This is an assistance to vessels in reaching the wharves, but the width is not sufficient for convenience.

It is estimated that $37,000 will be required to complete the existing project and that that amount can be profitably expended in the year ending June 30, 1895.

HARBOR AT ROCKLAND, ME.

This harbor is in the southwest part of Penobscot Bay, and is so located as to form a convenient harbor of refuge for many coasting vessels.

The project for improvement, adopted in 1881 and modified in 1890, provides for the construction of a breakwater 3,940 feet in length from Jameson Point, the object being to protect the anchorage from easterly storms, to all of which it was originally exposed.

The completion of the project will greatly increase the area for anchorage and afford an excellent harbor of refuge.

The estimated expense of the entire breakwater is $632,500. The amount of expenditures to June 30, 1893, is $199,136.45, the result of which has been to protect a part of the harbor, giving a secure harbor of refuge for many vessels trading near this port.

It is estimated that $412,500 will be required to complete the existing project, of which $100,000 can be profitably expended in the fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

Receipts and shipments.

	Tons.		Tons.
Brick, cement, and sand	3,709	Lime	150,000
Coal	31,205	Stone	54,200
Fish and salt, etc	2,366	Wood and cooperage	71,950
Grain and flour	5,084	Ice	5,500
General merchandise	64,318		
Lumber and shiptimbers	23,234	Total	411,566

Total tonnage of freights, 528,805.
Arrivals of steam vessels, 2,529.
Arrivals of sailing vessels for last fiscal year, 4,914.
Arrivals of sailing vessels for refuge only during last fiscal year, 1,200.

MOOSABEC BAR, ME.

Moosabec Reach is a thoroughfare about 12 miles in length, well protected from the sea by the adjacent islands. It is traversed by thousands of vessels annually and used to a considerable extent as a harbor of refuge, for which purpose it is admirably adapted. The bar is at the east end of this reach, near the town of Jonesport and about 30 miles east of Mount Desert.

Before improvement the bar gave but about 6 feet depth at mean low water and the thoroughfare was of but little use save at high water.

The project adopted in 1881 and extended in 1888 provided for the widening the 14-foot channel to 300 feet, for removal of ledges obstructing the channel, and for the construction of a small breakwater to divert cross currents.

The total amount appropriated for the project is $85,000. All the branches of the project have been completed except the removal of the ledge, which is now under course of removal. At the close of the fiscal year 1893 the work was sufficiently advanced to be of practical benefit to commerce.

It is estimated that $65,000 will be required for the completion of this work, and that $25,000 can be profitably expended during the coming fiscal year.

COMMERCIAL STATISTICS.

The benefits derived from the improvement are not local, the thoroughfare being used by coastwise vessels both as a harbor of refuge and as a sheltered route in bad weather. It is, therefore, impracticable to obtain accurate commercial statistics. The number of vessels passing through the reach annually has been estimated to be as great as 25,000.

HARBOR AT BACK COVE, PORTLAND, ME.

The project, for the improvement of this harbor, adopted in 1886, is to widen and deepen the channel from a width of 100 feet and a depth of 8 feet, which was made available to that extent in 1874, to a width of 300 feet and a depth of 12 feet at mean low tide, with a turning basin at the upper end. This project, now in process of execution, is estimated to cost $180,000.

There was expended, under the existing project, up to June 30, 1892, $51,691.61. At that time the channel had been extended for a distance of 4,050 feet, 12 feet deep at low water, and 90 feet wide, and a turning basin 400 feet wide had been excavated.

During the following year there was expended $24,638.60, which was applied to widening the channel under contract, making the total amount of expenditures up to June 30, 1893, under the existing project, $76,330.21.

Proposals for dredging, involving the expenditures of the appropriation of July 13, 1892, were twice invited, but each time the prices were high, and the bids were all rejected.

It is estimated that $83,750 will be required to complete this project, and that $50,000 can be profitably expended during the fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

Receipts and shipments in 1892.

	Tons.		Tons.
Coal	35,771	Railroad ties	560
Clay and sand	19,025		
Wood	125	Total	55,481

Number of vessels arriving in calendar year 1892.

Sailing vessels:	
Drawing from 15 to 20 feet, 1,000 to 1,500 tons each	7
Drawing from 12 to 17 feet, 500 to 1,000 tons each	36
Drawing from 9 to 10 feet, 200 to 500 tons each	50
Drawing less than 9 feet, 35 to 150 tons each	137

BREAKWATER FROM MOUNT DESERT TO PORCUPINE ISLAND, MAINE.

The object of this improvement is to protect anchorage and landing at Bar Harbor from storms and seas from southerly directions, which, at times, renders the anchorage insecure, and the landing of passengers and freight at the wharves difficult.

The original project provided for the construction of a riprap breakwater in a direct line from Porcupine Island to Dry Ledge, and thence to within a short distance of Mount Desert Island. The project was modified in 1889 and again in 1893.

The last modification provided for a breakwater on the direct line first proposed, but somewhat shorter, terminating about 600 feet from the low-water line on Mount Desert Island, thus reducing the estimated cost to a little more than one-half of that of the last project. It is reported that the project, as now modified, will answer all needful requirements.

The expenditures up to the close of the fiscal year ending June 30, 1892, amounted to $34,205.37. At that date 30,473 tons of stone had been deposited in that part of the breakwater between Porcupine Island and Dry Ledge.

The expenditures during the fiscal year just ended were $19,930.55. As a result that part of the work between Porcupine Island and Dry Ledge has been completed. Work was commenced on the part west of Dry Ledge, and 9,921 tons of stone has been deposited.

It is reported by masters of vessels that the work thus far done has been of great benefit.

It is estimated that $270,000 will be required to complete the existing project, and that $50,000 can be profitably expended during the fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

It is reported that there is no material difference between the commercial statistics relating to Bar Harbor for the calender year 1892 and those for last year. It is impracticable to obtain details, but the entire tonnage of the harbor for 1892 is reported as 34,044 tons. The number of passengers is reported as 115,561.

During the summer season the locality is much frequented by pleasure craft.

BELFAST HARBOR, ME.

Belfast is a port of entry, upon the northeastern part of Penobscot Bay, and is the receiving and shipping port for a large area of surrounding country. The city of Belfast has over 5,000 inhabitants. The river and harbor act of 1888 provided for a survey of this harbor.

The survey showed no material deteriorations of former improvements, but, owing to the general increase in tonnage and draft of coasting vessels, the depth of water was found to be insufficient. This is the cause of great inconvenience and frequent delays, especially to the five steamboat lines which touch at this port.

The present project was adopted in 1890, by which it was proposed to dredge a channel 250 to 300 feet wide, and 15 feet deep at mean low tide. from the deep water at the entrance to the upper harbor; to

dreage an area on the north side of the harbor to a depth of 8 feet; and to dredge an area on the south side of the channel to a depth of 13 feet.

The total expenditures under the former and the existing projects up to June 30, 1892, were $35,000. At that date the 8-foot dredging had been completed, leaving the 13-foot and 15-foot dredging yet to be done.

The river and harbor act of 1890 appropriated $10,000 for commencing this work.

It is estimated that $32,000 will be required for the completion of the existing project, all of which could be profitably expended in the coming fiscal year.

COMMERCIAL STATISTICS.

Receipts and shipments, 1892.

	Tons.		Tons.
Coal	10,800	Ice	8,000
Farm produce	915	Lime	1,410
Fertilizers	3,000	Stone	6,000
Grain	5,000	Wood	850
Hay	7,450		
General merchandise	21,200	Total	67,525
Lumber	2,900		

HARBOR OF REFUGE AT LITTLE HARBOR, N. H.

The Piscataqua River has two mouths, one of which forms Portsmouth Harbor and the other Little Harbor.

In the dangerous storms it is impossible for a sailing vessel to enter Portsmouth Harbor against the ebb tide. So many vessels have been wrecked in attempting this that a life-saving station has been established here.

In Little Harbor there would be safe refuge for a large number of vessels but for the fact that the water is too shallow save for those of small size.

The project adopted in 1888 contemplates two small breakwaters at the entrance to the harbor, dredging the channel, and enlarging the anchorage to an area of about 49 acres with a depth of 12 feet.

The total expenditures up to June 30, 1892, have been $42,422.83. These expenditures have been applied to dredging part of the area for an anchorage, and to the partial construction of the breakwater on the south side of the harbor.

The expenditures during the fiscal year ending June 30, 1893, were $3,068.03.

The operations consisted in work on the partially completed breakwater at south side of the entrance to the harbor, and in dredging the anchorage. The breakwater is not yet finished, though it affords some protection. The dredging of the anchorage was commenced during the latter part of May, 1893, and by the close of the year about 47,500 cubic yards had been dredged.

It is estimated that $135,000 will be required to complete the existing project, and that $25,000 can be profitably expended during the ensuing fiscal year.

HARBOR AT BURLINGTON, VT.

This improvement dates from 1836, modifications of the original plan having been made from time to time, so as to afford adequate protection to the increasing commercial and shipping interests of the harbor. The last modification, made in 1886, provides for further extension of the

breakwater, both to the north and to the south, with its gradual withdrawal as it is prolonged, into water about 30 feet deep, instead of 38 feet deep, so as to reduce the cost.

The old parts of the under superstructure are much decayed, and the balance available will be expended in repairs, as also the additional funds asked for.

It is estimated that $129,000 will be required to complete the existing project, and that $10,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels, 1892.

	Arrivals.		Departures.	
	No.	Tons.	No.	Tons.
From and to lake ports	2,152	634,494	2,148	634,393
From and to Canadian ports	128	19,112	122	18,172
Total	2,280	653,606	2,270	652,565

HARBOR AT BOSTON, MASS.

The inner and outer harbors at Boston are united by a deep water way, each being accessible from the sea by a distinct channel, widening into a deep and spacious roadstead. Both are divided into several minor harbors, and contain many islands, which afford sheltered anchorage.

The object of this improvement is, first, to preserve the harbor by protecting the islands and headlands; and, second, to improve it by widening, straightening, and deepening the channels.

The projects adopted for this purpose since 1866 have been mainly in accordance with the recommendations of the U. S. commissioners whose labors terminated during that year.

The works of preservation consist of sea walls, aprons, jetties, etc., which protect the shores of the islands and headlands, prevent additional wash into the channels, control tidal scour, and preserve the full height of anchorage shelter for vessels in the roadsteads. Such have been built or repaired at Point Allerton, and the islands of Great Brewster, Lovells, Gallops, Long, Deer, Rainsford, Georges, and Castle.

The works of improvement have been by dredging and blasting, by which means many dangerous rocks and shoals have been removed and the main ship channel enlarged from 100 feet wide and 18 feet deep at mean low water, so that it is now at least 625 feet wide and 23 feet deep at mean low water.

The following tributary channels have also been improved:

Charles River.—The natural channel of this river has been widened, straightened, and deepened, so that from its mouth to Western Avenue bridge, a distance of $4\frac{3}{4}$ miles, the channel has a width of 200 feet, and a depth of 7 feet at mean low water; thence to Arsenal Street bridge, $2\frac{1}{2}$ miles, the channel has a least width of 80 feet and a least depth of 6 feet.

Fort Point Channel.—This important branch of the main ship channel had a least depth of 12 feet at its entrance, and the channel was narrow and crooked. It has been widened to 175 feet, and deepened to 23 feet at mean low water from its mouth to Congress Street bridge, a distance of 1,900 feet.

NantasketBeach Channel.—This channel was originally about 50 feet wide, 8 feet deep at mean low water. It is now 150 feet wide, 10 feet deep at mean low water.

Channel between Nix's Mate and Long Island.—This channel had originally 4½ feet depth at mean low water. A cut has been made through the bar 300 feet wide, 15 feet deep at mean low water.

Repairs were made to the sea wall at Great Brewster Island, and the riprap at the west end of the Long Island sea wall was extended.

The total expenditures to June 30, 1892, were $2,216,351.59.

During the fiscal year the main ship channel was widened at the upper middle from 800 feet to 850 feet, and at Jeffreys Point from 275 feet wide to 350 feet wide.

Contracts were made also during the same year for dredging in the main ship channel, in the channel off Jeffreys Point, and the Nantasket Beach Channel, all of which were in force at the close of the fiscal year.

The Chief of Engineers of the U. S. Army closes his last report on this harbor and its tributary channels with the following statement:

> At the date of this report the several works of preservation are in fair order; the main ship channel is 23 feet deep at mean low water, 1,100 feet wide west of the upper middle, 850 feet wide at the upper middle, 1,000 feet wide at the lower middle, and at least 625 feet wide at the Narrows. The subsidiary channels are in the same condition as at the date of the last report.

It is estimated that $1,300,000 will be required to complete the existing project, and that of this amount $700,000 can be profitably expended during the fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

The amount of revenue collected during the year 1893, $15,791,588.16.

Shipping.	No.	Tons.
Entrances:		
Foreign	2,373	1,633,740
Clearances:		
Foreign	2,231	1,330,165

Importations:	
Merchandise	$79,357,654
Coin and bullion	29,207
Exportations:	
Foreign merchandise	865,265
Domestic merchandise	84,596,157
Coin and bullion	2,250,250

HARBOR AT LYNN, MASS.

Lynn Harbor is situated 9 miles northeast of Boston. The city of Lynn has a population of 56,000.

The original channels were narrow and crooked and had but a 6-foot depth at mean low water.

The existing project, which was adopted in 1884, proposes a channel 400 feet in width and 10 feet in depth through the outer and inner bars.

It is supposed that the inner channel will require occasional dredging. A training wall to aid in keeping the outer channel open was proposed, providing experience should necessitate it.

In 1888 it was proposed to extend the inner channel 400 feet within the harbor line, and to excavate at its inner end an anchorage basin

500 by 300 feet in area, 10 feet deep at mean low water, at a cost of $25,000.

The estimated cost of the original project was $157,000.

The total appropriations to date have been $101,000.

It is estimated that $81,000 will be required to complete this project and that of this amount $20,000 could be profitably expended during the fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

Amount of revenue collected during year 1893 ..... $4,755.48

Shipping.	1891.		1892.		1893.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
Entrances:						
Foreign	18	1,878	33	2,760	42	4,030
Domestic	453	95,130	734	150,000	1,207	245,213
Clearances:						
Foreign	21	2,702	31	3,790	48	5,348
Domestic	447	93,870	736	146,000	1,207	245,213

Imported.	1891.	1892.	1893.
	Tons.	*Tons.*	*Tons.*
Coal	147,000	148,577	139,102
Iron	750	1,447	485
Lumber	12,380	*10,326,000	*5,911,000
Merchandise	-----	-----	†2,540,000
Miscellaneous	22,786	25,000	21,956

* Feet. † Shingles, laths, etc.

All classes of vessels frequent the harbor, drawing from 12 to 16 feet of water.

HARBOR AT NANTUCKET, MASS.

Nantucket Harbor has deep water inside, and the object of this improvement is to make it a harbor of refuge for vessels plying between ports north and south of Cape Cod, estimated to number 30,000 annually. This harbor is the only one for a stretch of 100 miles, with the exception of the small one at Hyannis.

Before the commencement of the present work there was a shoal about 1½ miles in width outside the entrance, through which the channel or line of best water was only about 6 feet deep, and very crooked and shifting.

The present approved project is to construct two jetties as training walls, one on each side of the harbor entrance, planned so as to allow the tidal current to assist in scouring out and maintaining a good channel, and for the completion of the work by dredging where necessary to obtain a depth of 15 feet at low water in this channel; all at a total cost estimated in 1885 at $375,000, of which $170,000 was appropriated prior to the commencement of the fiscal year.

One hundred and ninety-five thousand dollars has been appropriated and $169,886.58 had been expended on this work up to June 30, 1892, by which the west jetty had been built to 3,955 feet length with full height, the east jetty had been built to 834 feet length with full height, and, after a gap of 160 feet, 1,300 feet length had been raised to half-tide level.

During the past fiscal year plans have been made for work under the new appropriation. A minor survey was made to serve as basis for the coming season's work.

The balance available is to be applied to the further extension of the east jetty and raising low places in the west jetty, together with a little dredging if necessary.

It is estimated that $180,000 will be required for the the completion of this project, and that of this amount $100,000 can be profitably expended during the fiscal year ending June, 30, 1895.

COMMERCIAL STATISTICS.

The commerce arriving and leaving Nantucket Harbor by water during the calendar year ending December 31, 1892, is estimated as follows (based mainly upon reports received from Mr. Joseph W. Clapp, collector of customs, Nantucket, Mass.):

Class of goods.	Exports.	Imports.	Total.	Tonnage.
Fish, oysters, etc.	$12,500	$3,000	$15,500	70
Live stock and products	.....	9,000	9,000	28
Vegetables and truck	.....	10,000	10,000	.....
Grain and forage	.....	28,000	28,000	610
Rice	.....	960	960	6
Tobacco	.....	39,500	39,500	50
Fertilizers	.....	20,000	20,000	1,000
Lumber and products	.....	15,300	15,300	1,500
Coal, minerals, and products	.....	42,000	42,000	7,000
Machinery and hardware	.....	20,000	20,000	150
General merchandise	.....	120,000	120,000	1,500
Sundries	.....	75,000	75,000	1,800
Total	12,500	382,800	395,300	13,700

Gain over last year, about 3,000 tons, or $90,000. Transportation lines established during the year, sailing packet line (William T. Swain, owner) between Nantucket and New Bedford, Mass.

The passage of vessels through this waterway is estimated as follows (each entrance and departure together being counted as one passage):

Character or class of service.	No.	Average draft.	Average tonnage.
Steam:		*Feet.*	*Tons.*
Freight and passenger*	460	7.5	500
Fishing	1	4	50
Tugs	1	4.5	50
Sails:			
Freight	3	8	300
Fishing boats	12	3	3
Pleasure boats, large	21	4	3
Pleasure boats, small	15	5	3

* 16,000 excursion passengers.

HARBOR AT NEWBURYPORT, MASS.

The city of Newburyport, with a population of 14,000, is situated on the Merrimac River, 2½ miles from its mouth and about 30 miles northeast of Boston.

The outlet of the river between Plumb Island and Salisbury Point is 1,000 feet wide and 30 feet deep at mean low water. At a distance of nearly a mile outside lies a sandy bar, through which, previous to the improvement, a channel variable in position and direction, with a depth of 7 feet at mean low water, was maintained by the current of the river.

The object of the improvement is to create a channel through the outer bar, 1,000 feet wide and with a least depth of 17 feet at mean low water, or 24½ feet at mean high water.

The project, adopted in 1880 and modified in 1883, is to build two converging rubblestone jetties, so located as to give a proper direction to the current, and thereby produce and maintain the desired result. The estimated cost of the project was $375,000.

The original depth of water on the bar was 7 feet at mean low water.

To June 30, 1892, $251,023.79 had been expended, and the north jetty was 2,675 feet long, of which 2,485 feet had been completed. The south jetty was 1,300 feet long, of which 1,077 feet had been completed.

The Plum Island dike was 817 feet long, 5½ feet high above mean low water, except near the center, where a weir 150 feet long and 2 feet above mean low water was left temporarily.

The sand catch in rear of the south jetty was in two branches, one 480 feet long and one 572 feet long.

All these works were in good order. On September 16, 1892, a contract was entered into to deposit 15,000 tons of rubblestone in the north jetty. Operations under this contract were commenced in May, 1893, and during the fiscal year 669 tons of stone had been placed in the north jetty, essentially completing 25 feet of its length. During the latter part of June, 1893, a survey of the bar was made. It showed that the channel across the bar had straightened, widened, and deepened since the survey of 1891, it being not less than 13.6 feet deep.

The condition of the Plum Island dike, the south jetty, and the catch sand remain unchanged since June 30, 1892.

The advantages to be derived from the completion of the project are increased safety and facility of navigation.

It is estimated that $97,500 will be required for the completion of the existing project, and that this entire amount can be profitably expended during the fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

Amount of revenue collected, 1893, $918.01.

Shipping.	No.	Tons.
Entrances:		
Foreign	2	146
Domestic	.....	.....
Clearances;		
Foreign	13	2,362
Domestic	1	399
Lumber imported ..... feet..		34,260
Lath imported ..... number..		98,600
Miscellaneous imported		115

Average draft of vessels entering the harbor is 10 feet; maximum draft, 15 feet. The coal business at this port is annually increasing, but there being no inspector, statistics can not be given.

HARBOR AT PLYMOUTH, MASS.

Plymouth Harbor is 30 miles south of Boston. The object of its improvement is to perpetuate the harbor by the preservation of Long Beach, which forms it, and to deepen and widen the channels of approach to an enlarged anchorage basin in front of the town wharves.

The original project for improvement was adopted in 1875 and modified in 1877 and 1884. The modified project proposed an improved channel 2,286 feet long, 150 feet wide, and 9 feet deep at mean low water, leading to an anchorage basin 866 feet long, 150 feet wide, and 9 feet deep.

The total appropriations to date have been $179,766.90.
The expenditures to June 30, 1892, were:

For beach protection	$122,553.77
For dredging	45,719.83
Total	168,273.60

On June 30, 1892, the improved channel was 2,286 feet long, 130 feet wide; the basin was 866 feet long, 150 feet wide; both were 9 feet deep at mean low water. Long Beach was in fair condition, but additional bulkheads were needed at its southern end.

On September 16, 1892, a contract was entered into to widen the improved channel to 150 feet. Operations under this contract were commenced in December, 1892, and were satisfactorily completed in April, 1893, according to the requirements of the project.

It is estimated that $1,500 will be required for repairs and extensions of the works protecting Long Beach.

COMMERCIAL STATISTICS.

Amount of revenue collected, 1891, $73,536.29; 1892, $73,808.36; 1893, $47,330.06.

Shipping.	1892.		1893.	
	No.	*Tons.*	*No.*	*Tons.*
Entrances:				
Foreign	2	196	3	286
Domestic	103	.....	108	.....
Clearances:				
Foreign	9	1,817	8	1,721
Domestic	.....	.....	.....	.....

Imported.	1891.	1892.	1893.
Coal.....tons..	18,065	16,861	19,094
Iron.....do...	1,973	1,443	650
Lumber.....feet..	6,160	3,303,463	2,085,000
Sand.....tons..	.....	295	140
Miscellaneous.....do...	330	1,145	2,173

Coasting vessels drawing from 7 to 13 feet frequent the harbor.

HARBOR AT PROVINCETOWN, MASS.

Provincetown Harbor is situated at the extremity of Cape Cod, about 40 miles southeast from Boston Light. It is one of the most valuable harbors of refuge on the Atlantic coast, the entire commerce of New England and a very large local fishing interest being directly interested in its maintenance, which depends entirely on the preservation of the sandy beaches which inclose it. Since 1826 the project has been a general one, and provides for the preservation of the harbor by building dikes, bulkheads, and sand catches, and extensive planting of beach grass, to repair and prevent storm damages to the beaches. A special dike across House Point Island Flats, to be built contingently, was recommended in the annual report for 1886.

From the nature of the work it can at no time be considered completed.

The total appropriations to date have been $152,918.44.

The amount expended to June 30, 1892, was $147,635.09.

No active operations were in progress during the fiscal year, and at the date of this report all the works of preservation are in good order

with the exception of the sand catches at the west end of Abel Hill Dike, for the repair of which sufficient funds are available.

It is estimated that $1,500 can be profitably expended for repairs during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Amount of revenue collected, 1893, $492.77.

Shipping.	Number.	Tons.
Entrances:		
Foreign	56	8,781
Domestic	14	800
Clearances:		
Foreign	22	2,627
Domestic	27	6,750

	Tons.		Tons.
Coal	6,500	Lumber	1,500
Iron	1,500	Miscellaneous	3,800

All classes and nationalities of vessels visit the harbor for shelter or with cargo. Four thousand vessels entered the harbor during the year.

HARBOR AT HYANNIS, MASS.

The harbor of Hyannis lies on the south shore of the peninsula of Cape Cod, about 15 miles to the westward of the heel of the cape, and is an important harbor of refuge.

Before improvement it was an open roadstead, exposed to southerly storms.

In the years 1827–1838 a breakwater of riprap granite 1,170 feet long was constructed, covering an anchorage of about 175 acres, the entrance to which has a depth of about 15½ feet. Between the years 1852 and 1882 extensive repairs were made in increasing the width of its base and the size of the stone forming its sides and top.

The approved project of 1884 provides for the dredging of an area of about 34 acres of shoal north of the breakwater to a depth of 15½ feet, the object being to afford additional anchorage. The total cost of all of which was estimated in 1884 at $45,743.20, inclusive of $81.20 left over from a former project, of which $28,081.20 was appropriated prior to the commencement of the fiscal year.

This harbor is valuable mostly as a harbor of refuge.

It is estimated that $11,662 will be required to complete the existing project, and that this entire amount can be profitably expended during the coming fiscal year.

COMMERCIAL STATISTICS.

The commerce arriving and leaving Hyannis Harbor by water during the calendar year ending December 31, 1892, is estimated as follows, based mainly upon reports received from Mr. William Crocker, Hyannis, Mass.:

Class of goods.	Exports.	Imports.	Total.	Tonnage.
Fish, oysters, etc	$10,400	$680	$11,080	190
Vegetables and truck	500	.....	500	30
Grain and forage	.....	95,000	95,000	5,000
Lumber and products	.....	37,000	37,000	1,800
Coal, minerals, and products	7,000	60,000	67,000	13,200
General merchandise	.....	27,000	27,000	450
Sundries	.....	800	800	200
Total	17,900	220,500	238,400	20,900

Gain over last year, about 5,000 tons or $55,000. Transportation lines established during the year, none.

The passage of vessels through the waterway is estimated as follows (each entrance and departure together being counted as one passage):

Character or class of service.	No.	Average draft.	Average tonnage.
Steam:		*Feet.*	*Tons.*
Freight and passenger	25	10	400
Freight, mainly	50	13	800
Passenger, mainly	10	7	200
Fishing	40	11	250
Tugs	250	9	100
Pleasure boats	550	3	10
Sail:			
Freight	2,500	12	300
Fishing boats	400	3	8
Oyster boats	5	3	6
Pleasure boats, large	160	10	100
Pleasure boats, small	200	4	10

HARBOR AT VINEYARD HAVEN, MASS.

Vineyard Haven is a deep indentation in the northern shore of Marthas Vineyard Island. Its form is triangular and the harbor covers an area (between the shore lines) of about 956 acres, of which area about two-thirds has a depth of not less than 15 feet. The harbor faces the northeast.

The object of improvement is to protect the headlands on each side of the indentation, known respectively as the East and West Chop, from wearing away by the action of the waves in storms and to prevent the formation of shoals, as a result of the deposit of débris by the current in the harbor, thus gradually impairing the anchorage capacity.

The approved project of 1887, as modified in 1889, provides, for avoiding the above-mentioned evils, the construction of stone sea walls and jetties to be built along the beach in front of the bluffs at both headlands. Up to June 30, 1892, there had been appropriated for this work $42,500 and of that amount $34,904.23 had been expended, the result of which has been the construction of a sea wall 450 feet long and a jetty 50 feet long at the East Chop, and a sea wall 400 feet long and 3 jetties of from 80 to 296 feet long, a wharf and a short breakwater 60 feet long at the West Chop.

It is estimated that $17,500 will be required to complete the existing project, and that this entire amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The commerce arriving and leaving Vineyard Haven Harbor by water during the calendar year ending December 31, 1892, is estimated as follows (based mainly upon reports received from Mr. Edward C. Lord, Vineyard Haven, Mass.):

Class of goods.	Exports.	Imports.	Total.	Tonnage.
				Tons.
Fish, oysters, etc	$36,000	$300	$36,300	500
Live stock and products	3,500	40,000	43,500	200
Vegetables and truck	300	5,000	5,300	15
Grain and forage	.....	45,000	45,000	2,500
Rice	.....	4,000	4,000	45
Tobacco	.....	10,000	10,000	15
Cotton and products	.....	10,000	10,000	20
Fertilizers	.....	2,000	2,000	50
Lumber and products	.....	25,000	25,000	2,500
Coal, minerals, and products	.....	40,000	40,000	8,000
Machinery and hardware	.....	5,000	5,000	100
General merchandise	.....	600,000	600,000	5,000
Sundries	.....	10,000	10,000	1,500
Total	39,800	796,300	836,000	20,430

Gain over last year, about 4,000 tons or $165,000. Transportation lines established during the year, none.

The passage of vessels through this waterway is estimated as follows (each entrance and departure together being counted as one passage):

Character or class of service.	No.	Average draft.	Average tonnage.
		Feet.	*Tons.*
Steam:			
Freight and passenger	1,500	10	600
Freight mainly	200	16	1,000
Passenger mainly	50	12	900
Fishing	10	10	200
Tugs	500	11	100
Pleasure boats	200	9	200
Sail:			
Freight	7,000	15	500
Fishing boats	300	10	150
Pleasure boats, large	500	10	100
Pleasure boats, small	200	5	10

HARBOR OF REFUGE AT SANDY BAY, CAPE ANN, MASS.

Sandy Bay is situated at the northeastern extremity of Cape Ann, Massachusetts. It is open to the effects of easterly and northeasterly storms.

The proposed improvement contemplates the construction of a national harbor of refuge of the first class. The anchorage covered by the breakwater will contain an area of 1,377 acres, which has a depth exceeding 24 feet at low tide. The cost of this improvement is estimated to be $5,000,000.

The original project for improvement was submitted in 1884. It proposed a continuous breakwater 9,000 feet long, divided into 2 branches; one starts at Averys Ledge and runs in a direction a little west of north to Abners Ledge, a distance of 3,600 feet; the other extends 5,420 feet from Abners Ledge in a northwesterly direction and terminates at the 84-foot contour off Andrews Point; and proposed to build only the substructure of the breakwater of rubblestone. The present project, approved March 17, 1892, proposes to build the entire breakwater of rubblestone.

The total appropriations to date are $600,000. The expenditures, not including outstanding liabilities, to June 30, 1892, were $399,341.89.

The condition of the improvement on June 30, 1892, was as follows: 515,688 tons of rubblestone had been deposited in the breakwater, essentially completing the substructure to a grade 22 feet below mean low water, between cross ranges 140 and 4740. Twenty-two thousand two hundred and forty-six tons of rubblestone was afterwards deposited to complete a contract existing at that date.

On September 30, 1892, a contract was entered into for the deposit of 14,000 tons of large stone and 120,000 tons of small stone in the breakwater. Operations under this contract were commenced in October, 1892, and at the close of the fiscal year 53,139 tons of small stone and 724 tons of large stone had been deposited, approximately completing 50 feet of the breakwater.

The prospective benefits to commerce and navigation by the completion of this harbor of refuge are increased safety to life and property, and a consequent reduction in freights and insurance.

It is estimated that $4,400,000 will be required to complete the existing project, and that $500,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS FOR YEAR ENDING JUNE 30, 1893.

Stone shipped	tons	170,000	Lobsters received	barrels	600
Coal received	do	8,126	Cod oil received	gallons	7,200
Wood received	cords	490	Medicine oil received	do	4,700
Lumber received	feet	250,000	Salt received	hogsheads	1,000
Fish received	pounds	2,340,000			

HARBOR AT GLOUCESTER, MASS.

The city of Gloucester is situated about 20 miles north of Boston and has a population of about 24,700. The harbor is an important center for the fishing fleet of New England.

The inner harbor was originally obstructed by sunken rocks and shoals, and the approaches to the wharves were shallow, varying from 1 to 12 feet in depth. The outer harbor was open to all southerly winds.

The first project for improvement was submitted in 1871, and proposed to build a breakwater from Eastern Point to Round Rock Shoal, and to clear the harbor of sunken rocks.

The present approved project was submitted in 1887. It proposed to remove from the inner harbor obstructing rocks and shoals, giving in front of the wharves, so far as Pew's Wharf, 15 feet depth at low water, and 10 feet in Harbor Cove, and to build a breakwater from Eastern Point to Round Rock Shoal, in substantially the same location as that proposed in the project of 1871.

The total appropriations to date have been $80,000.

The expenditures to June 30, 1892, were $36,692.37, and at that date the condition of the improvement was as follows: Clam Rock, Pinnacle Rock, rock off J. Friend's wharf, and rock off Pew's wharf had been reduced to the level of the surrounding bottom, and Babson's Ledge to 14 feet at mean low water. Two channels of approach to the wharfs in Harbor Cove had been dredged; each was 140 feet wide and 10 feet deep at mean low water; the eastern one was 550 feet long, the western 1,000 feet long. In the inner harbor 15 feet depth had been obtained in front of the wharves so far as the steamboat wharf, except over four small ledges uncovered by the dredging near the Halibut Company's wharf. Nothing had been done on the breakwater.

On September 16, 1892, a contract was entered into for the completion of the proposed dredging. No operations have been in progress during the fiscal year, and at the date of this report the condition of the improvement is the same as on June 30, 1892.

It is estimated that $752,000 will be required to complete the existing project, and that $250,000 can be profitably expended during the coming fiscal year.

COMMERCIAL STATISTICS.

Amount of revenue collected, 1893 ..... $9,083

Shipping.	Number.	Tons.
Entrances:		
Foreign	156	22,135
Domestic	9	1,490
Clearances:		
Foreign	145	18,021
Domestic	63	9,734

Coal, imported from coastwise ports	tons	30,000
Salt, imported	do	16,000
Lumber, imported	feet	288,000
Miscellaneous, imported	tons	500

All classes of vessels frequent the harbor, from 5 to 1,500 tons. Greatest draft, 24 feet.

Total number of vessels boarded during the year was 3,312, not including fishing vessels and boats.

HARBOR AT NEW BEDFORD, MASS.

The city of New Bedford, Mass., has a population of 41,000, large manufacturing industries, and a considerable commerce in addition to its whale fisheries. The harbor is an estuary of Buzzard's Bay and is the port of entry for the cities of New Bedford and Fair Haven.

Originally the channel had a depth of about 12½ feet at mean low tide.

The former project for its improvement as modified in 1877 provided for a channel 300 feet wide and 15 feet deep at mean low water from the deep water just above Palmer Island to the wharves at New Bedford. This project was completed at a cost of $20,000 in 1877. Since that time vessels of larger draft have been employed in the harbor, and vessels of 15 feet draft not only now touch the bottom in this channel, but in the channel below Palmer Island, which was not included in the former improvement. There is not sufficient water for the commerce of the port.

The project under which work is now carried on was adopted in 1888. It provides for the excavation of a channel 200 feet wide and 18 feet deep at mean low water extending from Butler Flats to the vicinity of the wharves at New Bedford.

Twenty-seven thousand five hundred dollars has been appropriated and $19,537.14 had been expended on this work up to June 30, 1892, by which the straight channel had been completed on its western side to 15 feet depth with 80 feet width over its entire length; and a slightly crooked channel of 80 feet width with 18 feet depth also existed over the same distance, wandering a little from the projected channel.

During the past fiscal year plans have been made for work under the new appropriation, and contract for the dredging entered into, work to be completed October 1, 1893. No work but preparation has as yet been done in the field.

The work required to complete this project is the excavation of the remaining half of the channel, 200 feet, and 18 feet deep, and the removal of a few shoal spots between "11-foot bank" and Butler Flats.

The balance available will be applied to the continuation of this project.

It is estimated that $7,500 will be required to complete this project, and that this amount can be profitably expended during the coming, fiscal year.

COMMERCIAL STATISTICS FOR YEAR ENDING JUNE 30, 1893.

Class of goods.	Exports.	Imports.	Total.	Tonnage.
				Tons.
Fish, oysters, etc	$150,000	$220,000	$370,000	92,000
Live stock and products	----------	8,200	8,200	70
Vegetables and truck	----------	93,100	93,100	930
Grain and forage	----------	535,000	535,000	23,000
Tobacco	2,000	----------	2,000	2
Cotton and products	----------	2,851,000	2,851,000	14,200
Naval stores	----------	20,700	20,700	2,000
Lumber and products	15,000	400,000	415,000	30,400
Coal, minerals, and products	1,200	1,600,000	1,601,200	400,300
General merchandise	8,410,000	2,800,000	11,210,000	112,000
Sundries	----------	1,552,000	1,552,000	52,000
Total	8,578,200	10,080,000	18,658,200	727,000

Gain over last year about 100,000 tons, or $2,500,000. Transportation lines established during the year, none.

The passage of vessels through this water way is estimated as follows (each entrance and departure together being counted as one passage):

Character or class of service.	No.	Average draft.	Average tonnage.
		Feet.	*Tons.*
Steam:			
Freight and passenger	700	8	560
Freight mainly	450	17	1,000
Passenger mainly	500	8	60
Tugs	650	8	50
Pleasure boats	250	.....	.....
Sail:			
Freight	1,700	13	800
Fishing boats	500	5	10
Pleasure boats, large	400	.....	.....
Pleasure boats, small	1,000	.....	.....

HARBOR AT SCITUATE, MASS.

This harbor is on the west shore of Massachusetts Bay, about 14 miles south of Boston Light.

The object of the improvement is to create a harbor of refuge for vessels bound to Boston from the eastward which are too far south of their true course to clear the dangerous ledges near Minots Ledge Light.

Originally the harbor had a low-water area of about 57 acres, more than 6 acres of which had a depth of at least 3 feet at mean low water. It was entirely open to the force of easterly gales, and its entrance was obstructed by sunken bowlders.

The project is to build two breakwaters, one from Cedar Point, on the north side of the entrance, and the other from the First Cliff, on the south side, and to dredge the area inclosed and to dredge also in front of the entrance, all at an estimated cost of $290,000.

The total amount appropriated to date is $73,680.

The north breakwater has been essentially completed, as has also the south breakwater to a length of 250 feet. The anchorage basin has been extended to an area of 350 by 450 feet, with a mean low water depth of 7 feet. The entrance to the channel has been made 1,600 feet long, 100 feet wide, and 5 feet deep at mean low water. The channel connecting the basin with the town wharves is 2,100 feet long, 100 feet wide and 3 feet deep at mean low water.

The prospective benefits to commerce by the completion of this improvement are the creation of an additional harbor of refuge on this much-frequented dangerous coast.

It is estimated that $217,000 will be required for the completion of this project and that $40,000 can be profitably expended during the coming fiscal year.

COMMERCIAL STATISTICS FOR YEAR ENDING JUNE 30, 1893.

Shipping.	Number.	Tons.
Entrances:		
Foreign	2	205
Domestic	22	3,080
Clearances:		
Foreign	.....	.....
Domestic	29	.....

Coal imported	tons..	2,500
Lumber imported	feet..	1,000,000
Lime imported	casks..	1,000
Bricks imported		150,000
Miscellaneous imported (herring)	barrels..	1,000

Coasting vessels drawing from 7 to 11 feet frequent the harbor.

INNER HARBOR AT MARTHAS VINEYARD, MASS.

The inner harbor at Edgartown lies in the northern part of the waterway or strait that separates Chappaquiddick Island from the east end of Marthas Vineyard. It extends southward about 1½ miles from Chappaquiddick Point opposite Edgartown, and averages about one-fifth of a mile in width.

This harbor is so completely landlocked as to form a safe harbor of refuge for small vessels, but the contracted width of the entrance and the resulting velocity of the tidal currents make it difficult to pass through.

The approved project of 1889 provides for the removal to 10 feet depth at low water of a "middle ground" shoal in the central part of the inner harbor, at a total cost estimated in 1889 at $4,500, of which $2,000 was appropriated prior to the commencement of the fiscal year.

At the adoption of the present project the middle ground shoal carried only about 6 feet depth of water and was a very troublesome obstruction.

Four thousand five hundred dollars has been appropriated and $1,934.01 had been expended on this work up to June 30, 1892, by which amount half of the shoal had been dredged to full depth.

During the year plans have been made for work under the new appropriations, all work to be done by hired labor and the use of the Government plant. A minor survey has been made to serve as a basis for the coming season's work. The dredging itself has been commenced and finished as far as funds allowed, a third quarter of the original shoal having been removed.

Further field work must await further appropriations.

It is estimated that $2,500 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Class of goods.	Exports.	Imports.	Total.	Tonnage.
				Tons.
Fish, oysters, etc	$3,000	$1,000	$4,000	1,200
Live stock and products	7,200	18,000	25,200	125
Vegetables and truck	3,000	.....	3,000	100
Grain and forage	.....	16,200	16,200	900
Rice	.....	400	400	3
Tobacco	.....	25,000	25,000	30
Cotton and products	.....	.....	.....	2,500
Fertilizers	.....	2,200	2,200	60
Lumber and products	.....	154,000	154,000	8,000
Coal, minerals, and products	500	17,500	18,000	2,500
Machinery and hardware	.....	180,000	180,000	500
General merchandise	.....	950,000	950,000	9,000
Sundries	59,000	9,000	68,000	9,500
Total	72,700	1,373,300	1,482,000	34,400

Gain over last year, about 4,000 tons, or $160,000; transportation lines established during the year, none.

The passage of vessels through this waterway is estimated as follows (each entrance and departure together being counted as one passage):

Character or class of service.	No.	Average draft.	Average tonnage.
Steam:		*Feet.*	*Tons.*
Freight and passenger	235	9	345
Fishing	60	11	120
Tugs	95	9.5	80
Pleasure boats	100	8	112
Sail:			
Freight	790	12	150
Fishing boats	8,850	3.5	9
Pleasure boats, large	750	5	11
Pleasure boats, small	2,400	2	3

CANAPITSIT HARBOR, MASS.

This water way lies about 20 miles south of New Bedford, running between the islands of Cuttyhunk and Nashawena, and connecting the waters of Vineyard Sound and Buzzards Bay.

The object of the improvement is to make this channel safe for the use of light-draft sailboats, and also especially of the surfboats belonging to the life-saving station of this dangerous locality.

The approved project of 1891 provides for the widening and deepening of the present channel from Vineyard Sound to the ocean, between the islands of Nashawena and Cuttyhunk, Massachusetts, so as to secure a depth of 6 feet at low water with a least width of 150 feet over its entire length, at a lotal cost estimated in 1891 at $4,800.

At the adoption of the present project the sand shoals, and especially the numerous bowlders, made this passage specially dangerous to the life-saving-station boats and other shallow-draft row and sail boats. The work so far done is of great value to the service of the boats of the life-saving station at this place and bids fair to be permanent in its good results.

Four thousand eight hundred dollars was appropriated for this work by act of July 13, 1892.

During the past fiscal year plans have been made for work under the appropriation, and the dredging itself has been commenced and completed as far as the funds provided allowed, a channel of about 66 feet width and at least 5 feet depth at low water having been cut entirely across the shoal, completing about half of the proposed work.

Special inspection and actual operations have demonstrated the inaccurateness of the original estimate, which was undoubtedly based upon field reports from persons not sufficiently experienced in making estimates upon works of just this nature.

It is now estimated that $5,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The commerce arriving and leaving Cuttyhunk, Mass., by water during the calendar year ending December 31, 1892, is estimated as follows (based mainly upon reports received from Mr. D. P. Bosworth, keeper life-saving station, Cuttyhunk, Mass.):

Class of goods.	Exports.	Imports.	Total.	Tonnage.
				Tons.
Fish, oysters, etc	$8,100	.....	$8,100	180
Live stock and products	610	$300	910	4
Vegetables and truck	70	.....	70	3
Grain and forage	.....	560	560	16
Tobacco	.....	1,500	1,500	1
Naval stores	.....	540	540	2
Lumber and products	.....	500	500	40
Coal, minerals, and products	480	350	830	350
General merchandise	.....	12,700	12,700	20
Sundries	200	200	400	70
Total	9,500	16,700	26,200	700

The passage of vessels through this waterway is estimated as follows (each entrance and departure together being counted as one passage):

Character or class of service.	No.	Average draft.	Average tonnage.
		Feet.	*Tons.*
Steam:			
Freight and passenger*	144	9	60
Passenger mainly	5	9	60
Pleasure boats	100	4	25
Sail:			
Fishing boats	1,000	3	6
Pleasure boats, small	300	4	15

* Carries mail daily in summer, weekly in winter.

HARBOR AT BLOCK ISLAND, R. I.

This island is about 14 miles east of the eastern end of Long Island and about 10 miles distant from the nearest point of the mainland.

The object of the improvement is to furnish a harbor of refuge for vessels engaged in foreign and coastwise commerce.

Before the construction of the present harbor, Block Island had no harbor which afforded protection for decked vessels.

Between 1870 and 1876, $285,000 was appropriated for a breakwater for a harbor for medium-draft vessels, this work being completed in 1878. Between 1880 and 1882, $25,000 was appropriated for an inner basin and the protection of the shore next the breakwater, this work being completed in 1884. In 1884, $15,000 was appropriated for additions to the old breakwater, this money being so spent in 1884–'85.

The approved project of 1884, as modified in 1888, provides for the construction of a harbor of refuge on the eastern side of the island, consisting of an enlarged inner harbor (or basin) for small vessels and an exterior harbor for large ones. The basin was to be about 800 feet square and completely inclosed except at its 100-feet-wide entrance. The exterior harbor was already formed by an old breakwater on the east and the adjacent shore on the south and west; but an old gap near the end of this breakwater was to be filled up. The project covers the construction of the stone sea walls of the enlarged inner harbor ($46,000), the repair of the old breakwater ($24,000), and a litt

dredging ($5,000) along the western side of the old breakwater and also inside the harbor; all at a total cost estimated in 1888 at $75,000, of which $50,000 was appropriated prior to the commencement of the fiscal year.

At the adoption of the present project this harbor was neither large enough nor well enough protected for the proper harborage of the craft seeking refuge at this place during storms and bad weather.

Seventy-four thousand dollars has been appropriated and $49,886.03 had been expended on this work up to June 30, 1892, by which the gap in the old breakwater had been filled up so as to make the breakwater of 1,900 feet total length; the north sea wall had been built to 170 feet length with full height, then came a gap of 190 feet length, then 130 feet length to full height, then 100 feet length to high-water level, and then 150 feet length to low-water level; the west sea wall had been started for 50 feet at its shore end; and the shoal west of the breakwater had been dredged to a depth of 9 feet from the steamboat wharf to within 100 feet of the north wall.

During the past fiscal year plans have been made for work under the new appropriations and contract for the stone work and fender piers entered into, work to be completed by October 1, 1893. A minor survey has been made to serve as basis for the coming season's work. A few days' field work has been done by the contractor.

It estimated that $1,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The commerce arriving and leaving Block Island, R. I., by water during the calendar year ending December 31, 1892, is estimated as follows:

Class of goods.	Exports.	Imports.	Total.	Tonnage.
				Tons.
Fish, oysters, etc	$89.000	$1,800	$90,800	8,280
Live stock and products	55,500	9,500	6,500	740
Vegetables and truck	5,000	900	5,900	270
Grain and forage	500	19,300	19,800	560
Rice	.....	1,800	1,800	10
Tobacco	.....	18,000	18,000	30
Fertilizers	.....	3,000	3,000	90
Lumber and products	.....	111,200	111,200	5,170
Coal, minerals, and products	.....	61,000	61,000	6,660
Machinery and hardware	.....	900	900	10
General merchandise	.....	338,600	338,600	4,500
Sundries	117,800	2,700	120,500	6,300
Total	267,800	568,100	835,800	32,600

The passage of vessels through this waterway is estimated as follows (each entrance and departure together being counted as one passage):

Character or class of service.	No.	Average draft.	Average tonnage.
		Feet.	*Tons.*
Steam:			
Freight and passenger	500	7	500
Fishing	350	7.5	130
Tugs	100	7.5	130
Pleasure boats	500	7	140
Sail:			
Freight	200	9	150
Fishing boats	5,000	8	30
Oyster boats	300	7	10
Pleasure boats, small	40,000	5.5	5

HARBOR AT NEWPORT, R. I.

This harbor is at the main entrance to Narragansett Bay, and all the year it serves as an easily accessible harbor of refuge to foreign and coastwise commerce.

Before improvement the capacity of the inner harbor was limited by shoals, and it was not adequate to the number and size of the vessels seeking it for refuge. The southern or main entrance was obstructed by a bar which stretched out from Goat Island, and the general business wharves of the city could not be reached at low tide by vessels drawing more than 8 feet.

The project of 1880 with its subsequent modifications, under which the present improvements are being carried on, provides as follows: For the widening and deepening of the channel from Narragansett Bay into Newport, so as to secure 15 feet depth at low water with at least 750 feet width; for the extension of the 13-foot depth and 10-foot depth anchorage basins; for the partial cutting off of the shoal spit at the southern end of Goat Island, and for the construction of jetties on the western shore of Goat Island so as to protect the end of this island from erosion, and to prevent the drift of sand, etc., around the island into the adjacent parts of the channel and harbor; all at a total cost estimated in 1890 at $156,200, of which $104,500 was appropriated prior to the commencement of the fiscal year.

The total amount of appropriations to date, under this project, is $129,500, and of that amount has been expended $104,497.80, with the following result:

The 15-foot channels and the 13-foot anchorage basins have been dredged, and one jetty, 133 feet long, has been built westward from Goat Island. The southern entrance has been completed for vessels of 15 feet draft, and of the total area to be dredged within the harbor (about 90 acres) about 66 acres has been completed.

The work required to complete the existing project is the dredging of Goat Island Spit to 15 feet depth, and the excavation of the 10-foot anchorage area; also the building of additional jetties outside of Goat Island, whenever they may be required to arrest the drift of littoral sand and gravel into the harbor entrance.

The balance available is to be applied to continuing the improvement.

It is estimated that $26,700 will be required for the completion of this project and that this entire amount can be profitably expended during the coming fiscal year.

COMMERCIAL STATISTICS.

Class of goods.	Exports.	Imports.	Total.	Tonnage.
				Tons.
Fish, oysters, etc	$15,000	$12,000	$27,000	500
Live stock and products	.....	8,000	8,000	70
Vegetables and truck	.....	40,000	40,000	400
Grain and forage	.....	60,000	60,000	4,000
Tobacco	.....	25,000	25,000	25
Cotton and products	.....	30,000	30,000	150
Fertilizers	.....	56,000	56,000	1,400
Lumber and products	.....	150,000	150,000	12,000
Coal, minerals, and products	.....	320,000	320,000	53,300
Machinery and hardware	.....	100,000	100,000	300
General merchandise	500,000	1,000,000	1,500,000	15,000
Sundries	100,000	200,000	300,000	3,000
Total	615,000	2,000,000	2,620,000	90,500

Character or class of service.	No.	Average draft.	Average tonnage.
		Feet.	*Tons.*
Steam:			
Freight and passenger	900	12	1,500
Freight mainly	300	10	1,000
Passenger mainly	3,000	8	300
Tugs	800	7	80
Pleasure boats	1,000	5	50
Barges, freight	200	12	250
Sail:			
Freight	1,000	10	150
Fishing boats	500	6	15
Pleasure boats, large	1,000	4	5
Pleasure boats, small	2,500	2	3

ENTRANCE TO POINT JUDITH POND, R. I.

Point Judith Pond is a shallow-draft salt pond, lying in the rear of the sandy beach of the Rhode Island shore, just west of Point Judith.

The improvement desired at this place by the people of the neighborhood is the reopening of an old entrance long ago closed by the ocean storms.

When the present appropriation was made in 1892, the entrance to this pond was very shallow (less than 3 feet), crooked, and variable in location.

Amount appropriated by act approved July 13, 1892	$7,500.00
June 30, 1893, amount expended during fiscal year	67.87
July 1, 1883, balance unexpended	7,432.13
July 1, 1893, outstanding liabilities	10.72
July 1, 1893, balance available	7,421.41

HARBOR AT BRIDGEPORT, CONN.

The city of Bridgeport has a population of about 50,000.

Former improvements, between the years 1837 and 1882, increased availability of the main channel in this harbor from a depth of 5 feet at mean low water to a depth of 12 feet at mean low water and to a width of 300 feet. A jetty was also built on the east shore to check the influx of sand.

In 1882 a new project was adopted for widening to 600 feet the channel from the inner beacon to the Naugatuck Railroad wharf, to provide for vessels driven in by bad weather without blocking the main channel. The estimated cost of the latter project was $60,000; it is very nearly completed. A small area remains near the inner beacon, which it is considered desirable to dredge. The project was extended in 1888 to include widening the channel above the railroad wharf in order to relieve the crowding at that point, and was further extended by act of Congress authorizing the expenditure of the appropriation of 1888 towards dredging a 9-foot channel up to the head of the upper harbor above the bridges, and by the river and harbor act of 1890, which directed the beginning of the breakwater from the tongue to the inner beacon. The total estimated cost of these extensions was $65,000, of which $30,000 has been appropriated.

Up to July 1, 1892, a channel 12 feet deep at mean low water existed from Long Island Sound nearly to the lower bridge, with widths from 75 to 600 feet; at the lower bridge shoaling had slightly reduced the depth. Above the lower bridge, practically to the head of navigation, the channel was 9 feet deep at mean low water, and from 60 to 90 feet

wide. The breakwater from the Tongue to the Inner Beacon had been built its full length, 1,165 feet, but not to the full cross section considered necessary for permanence; it afforded a shelter of value to the anchorage ground out to the lower wharves.

During the past fiscal year the anchorage between the Inner Beacon and the Naugatuck Railroad Wharf was widened by 170 feet, making the width of channel at that point about 770 feet. The location of this work was prescribed by the appropriation act, and being outside the project for improvement does not reduce the cost of completion of the project.

The Chief of Engineers, in his last annual report, recommends that future appropriations be applied to extending and widening the channel above the horse railroad bridge; to repairing the harbor channel and widening it above the railroad wharf; and to enlarging the breakwater as projected.

It is estimated that $35,000 will be required to complete the existing project, and that this entire amount can be profitably expended during the coming fiscal year.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR 1892.

Arrivals and departures of vessels.

[Draft, 6 to 18 feet.]

	No.	Tonnage.
Foreign arrivals	28	4,448
Foreign departures	15	2,425
Coastwise arrivals and departures	24,180	1,837,426
Total	24,223	1,844,299

Cargoes.

	Tons.	Estimated value.
Receipts	915,350	$42,670,000
Shipments	408,840	41,629,000
Total	1,324,190	84,299,000

During 1892 4,520 vessels, carrying 369,350 tons cargo, entered the harbor for refuge.

The severe gale on the 20th of April, 1892, destroyed considerable of the oyster industry, which to some extent diminished the number of vessels arriving and departing.

BLACK ROCK HARBOR, CONNECTICUT.

This harbor consists of a bay, partly sheltered by Fayerweather Islands, and of two small streams extending inland from the head of the bay. The depth in Cedar Creek, the more important of these streams, was from 2 to 4 feet at mean low water, and the channel was narrow and very crooked. The extent of the harbor is 1½ miles long, from northeast to southwest, and varying in width from 300 to 2,500 feet.

Cedar Creek affords important communication by water to the city

of Bridgeport and to several large manufactories in its immediate vicinity, in the interest of all of which the improvement of Black Rock Harbor is desired.

The depot of the lower part of the habor ranges from 6 to 12 feet at mean low water. This part of the harbor was formerly much used as a refuge for vessels overtaken by storms, but it is not deep enough for most vessels now engaged in commerce through the sound.

The project for improvement submitted in 1883 included dredging a channel 3,300 feet long, 80 feet wide, and 6 feet deep, to extend up Cedar Creek, and a breakwater from Fayerweather Island to the mainland. The estimated cost was $80,000.

The breakwater has been built to the full length, but not to the width and height projected. The proposed channel has been dredged to the full extent projected, but has slightly shoaled on the sides. This channel is largely used and is indispensable to the commerce of the upper part of the harbor.

There is a contract, now in force, providing for dredging the shoal parts of the channel, which will be deepened and the bends widened.

The Chief of Engineers recommends that future appropriations be applied to maintaining and extending the channel and to enlarging the breakwater, should necessity require it.

It is estimated that $35,000 will be required to complete this project, and that $10,000 can be profitably expended during the coming fiscal year.

COMMERCIAL STATISTICS FOR YEAR ENDING JUNE 30, 1892.

Freight received and shipped by water.

Articles.	Tons.	Estimated value.
Coal	45,602	$182,408
Iron and steel	1,200	21,600
Miscellaneous	5,651	173,595
Total	52,453	377,603

Vessels used in above traffic.

[Draft, 6 to 12 feet; tonnage, 50 to 456 tons.]

Steamers	141
Sailing vessels	80
Barges	261
Total	482

In addition to the above 2,100 vessels entered Black Rock Harbor for refuge during 1892.

The above figures show a decrease in tonnage of freight below that reported for 1891 of 6,530 tons.

BREAKWATERS AT NEW HAVEN, CONN.

New Haven Harbor is the only natural harbor of any considerable area and depth in Long Island Sound between New London Harbor, 45 miles east, and Huntington Bay, 32 miles southwest. At this point Long Island Sound is at its widest, and the broad, open mouth of the harbor left the anchorage grounds exposed to storms from a southerly quarter, so that vessels driven in by stress of weather were frequently

obliged to cross Fort Hale Bar, going from 2 to 4 miles up the harbor, and to anchor in the dredged channel, in order to reach secure shelter.

In 1880 a project was adopted for making a harbor of refuge at the entrance of New Haven Harbor by the construction of two riprap breakwaters; the first to be 3,300 feet long, extending northeasterly from the light-house on Southwest Ledge to Quixes Ledge; the second to be 4,200 feet long, extending northwesterly from Luddington Rock. The estimated cost was $1,311,134.

In 1889 a plan was suggested by the officer in charge for changing the location of the western breakwater to the southwest about 6,000 feet, and constructing a breakwater 5,000 feet long, which should start at a point 1,000 feet north 54 degrees east from Luddington Rock, and extend south 54 degrees west, crossing the rock; also for constructing a smaller breakwater from the east shore toward Quixes Ledge, to better protect the harbor from easterly storms, leaving an eastern entrance channel 800 feet wide and 13 feet deep. The cost of these works, in addition to the estimates of $1,311,134, would be about $840,000.

Upon appropriation of $120,000 by the river and harbor act of 1890, the above-described modifications were adopted.

Up to July 1, 1892, the East Breakwater, 3,450 feet long, had been completed, affording considerable shelter to the east side of the harbor, and 1,980 linear feet of the Middle Breakwater overlying Luddington Rock had been built to partial height and width. During the past fiscal year the Middle Breakwater has been extended about 931 linear feet, and part has been built up to the required dimensions; under an existing contract it will be further extended to a total length of about 3,400 feet, and the whole work enlarged. At its present length the breakwater affords partial shelter to about one-half the west entrance to the harbor.

Under future appropriations it is proposed to extend the breakwater.

It is estimated that $1,541,134 will be required to complete the existing project, and $500,000 can be profitably expended during the coming fiscal year.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR 1892.

Vessels passing New Haven Breakwater.

Men-of-war	34
Steamers of all kinds	42,860
Steamships	2,075
Ships, barks, and brigs	1,320
Schooners and sloops	54,750
Barges in tow, scows, etc	36,500
Total	137,539

These records are not complete, as many vessels pass unobserved in night.
The value of this commerce can not be ascertained.

FIVE MILE RIVER HARBOR, CONNECTICUT.

This harbor is a small inlet over a mile long, and from 300 to 800 feet wide, on the north shore of Long Island Sound, about 2 miles west of the mouth of Norwalk Harbor. The natural low-water depth at the mouth is about 3 feet, shoaling to zero half way up the harbor.

Since 1848 Five Mile River has been largely engaged in oyster-growing, and in this business now employs about 140 vessels.

These vessels could only enter or leave the harbor at high tide; consequently during their busy season they were obliged to lie up for the night at other and less convenient harbors.

The project for improvement proposed in a report on a survey made in 1886, and adopted under an appropriation of $5,000 made August 11, 1888, provides for dredging a channel 8 feet deep at mean low water, 100 feet wide, and about 6,000 feet long, extending to the head of the harbor; the cost was estimated at $25,000.

The total amount appropriated for this improvement is $15,000.

Up to July 1, 1892, $9,886.96 had been expended, and a channel 60 feet wide and 2,450 feet long had been dredged to a depth of 8 feet at mean low water, extending from long Island Sound to the vicinity of the lower wharves. This channel has been extended to some of the wharves by private work, and is now used for anchorage and for commercial purposes.

It is proposed to apply future appropriations to widening and extending the channel as projected.

It is estimated that $10,000 will be required to complete this project, and that this entire amount can be profitably expended during the coming fiscal year.

COMMERCIAL STATISTICS FOR CALENDAR YEAR 1892.

[From information furnished by Mr. Chas. W. Bell, of Five Mile River, Conn.]

Oysters raised	bushels..	720,000
Value of oysters raised		$432,000
Steamers employed		26
Sail vessels employed		112
Draft of above vessels	feet..	1½ to 8
Tonnage of above vessels	tons..	2 to 100
Value of above vessels, about		$225,000
Coal received by water	tons..	11,000

One thousand four hundred barrels of oysters were packed here for export to Great Britain; 28,000 barrels were packed at Norwalk and other places for export by planters that belong here, for we still lack water and wharfage to accommodate the business that would be done here. Round clams shipped from here, 800 barrels. Five cargoes of bricks brought here. Two hundred and fifty thousand bushels of oysters delivered on board of vessels here. One hundred vessels came in this harbor for refuge in the past year.

HARBOR OF REFUGE, DUCK ISLAND, CONN.

This harbor is a broad bay on the north side of Long Island Sound, about midway between the harbors of New Haven and New London, a distance of 46 miles in the widest part of the Sound, where there is no sufficient harbor of refuge for general commerce. Duck Island Harbor is large enough for such use, but is naturally unprotected from storms from any southerly quarter.

By order of Congress, examinations of this harbor were made in 1883 and 1886, and subsequently a project was adopted for making it a harbor of refuge by constructing three riprap breakwaters, the west one extending westerly from Duck Island, the middle one extending northeasterly from Duck Island, the east one extending southwesterly from Menunketesuck Point to the east limit of the harbor. The total length of these breakwaters was to be 5,880 feet and their estimated cost is $463,540.

Work under this project was begun in May, 1891, and up to July 1, 1892, 946 linear feet of the west breakwater had been built, extending it westwardly from Duck Island to a depth of 15 feet at mean low water. At this length it affords a limited shelter from southeast and south storms.

During the past fiscal year the work has been extended about 294 feet, making it 1,240 feet long, and under the existing contract it will be further extended to a total length of about 2,000 feet.

The total amount appropriated for this improvement is $60,000.

It is proposed to continue breakwater construction under future appropriations.

It is estimated that $403,540 will be required to complete this project and that $100,000 can be profitably expended during the coming fiscal year.

No record of the number of vessels passing this harbor of refuge has ever been kept.

For general purposes it may be estimated as about two-thirds the number passing New Haven breakwater, which was reported as 137,882 in 1891. The value of this commerce can not be ascertained.

HARBOR AT NEW HAVEN, CONN.

New Haven Harbor is a bay on the north shore of Long Island Sound, extending about 4 miles inland and from 1 to 2 miles wide. The Mill and Quinnipiac rivers empty into the head of the harbor; they are streams of no commercial importance, except for tidal navigation at or near their mouths.

The harbor channel is from 400 feet to a mile wide, with mud and sand flats on either side. When the Government began work in this harbor in 1867, the available low-water depth from the city wharves to Cranes Bar, about one-third way down the harbor was 9 feet; thence to Fort Hale, which is about half way down, it was 16 feet or over. A short distance below Fort Hale was a bar of very soft mud, extending across the harbor, with 13 feet available depth at mean low water. The entrance to the harbor was partially obstructed by several sunken rocks.

The first project for deepening the channel provided for making it 13 feet deep, which was done in 1871. It was widened at different times until 1878, when a project was adopted for dredging a channel 16 feet deep and not less than 400 feet wide. In 1882 a project was adopted for building a dike to extend out from Sandy Point, with an arm parallel to the channel and 3,200 feet long, in order to contract the channel and maintain 16 feet depth on Fort Hale Bar, when that depth should be obtained by dredging.

Up to July 1, 1892, the shore arm and 2,089 feet of the channel arm of the Sandy Point dike had been built; a 16-foot channel from 400 to 700 feet wide had been made and maintained all the way up the harbor to Tomlinson's bridge, except over the Fort Hale Bar, where the depth is but 13 feet.

Commerce in this harbor has been much hampered by shoaling and by insufficient width in the upper part, where relief seemed to be more urgently needed than at Fort Hale Bar; therefore, during the past fiscal year dredging was done to widen the channel between Long Wharf and Tomlinson's bridge, removing the shoals which had formed in the previous channel, making a depth of 16 feet at mean low water.

The increased width was of immediate benefit to vessels going to or from the wharves, or waiting for berth to unload.

It is proposed to apply future appropriations to dredging and, if necessary, to further extension of the dike.

It is estimated that $48,000 will be required to complete the existing project, and that this entire amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR 1892.

Value of imports	$459,934.16
Value of exports	$995,675.00
Revenue receipts	$115,484.85
Foreign vessels entered, 54; cleared, 42	96
Domestic vessels entered, 1,049; cleared, 1,050	2,099

Tonnage of vessels owned at this port, 58,186 tons.

Coastwise.

Articles.	Tons.	Value.
Coal received and shipped	860,000	$3,440,000
Iron received	145,475	4,364,250
Lumber received, 90,000,000 feet	140,000	2,750,000
Oysters received and shipped	77,525	725,000
Miscellaneous merchandise shipped	995,000	109,450,000
Miscellaneous merchandise received	925,000	139,750,000
Total	3,143,000	259,479,250

Vessels arriving and departing.

[Draft 6 to 20 feet.]

Steamers of all kinds	26,200
Sailing vessels	18,840
Barges in tow, scows, etc	14,560
Total	59,600

The above figures show an increased tonnage of freights over those reported for last year of 63,050 tons.

One new transportation line has been established since last report for 1891—namely, the "James Hughes Transportation Company."

HARBOR AT STAMFORD, CONN.

This harbor consists of a bay on the norths hore of Long Island Sound, and of two tidal inlets, known as the East and West branches, extending up to the village of Stamford. The original depth in the West Branch was from 1 to 3 feet, gradually increasing in the bay to a depth of 12 feet; the East Branch was originally a small marshy creek, deepened by private dredging to a depth of about 8 feet at mean low water.

The project of improvement adopted in 1886 provided for dredging a 5-foot channel 80 feet wide up to the head of the West Branch. This was accomplished in 1892. In that year a project was adopted providing for enlarging the channel of the West Branch to 150 feet width and 7 feet depth, and dredging out the basin between the harbor lines at the head of this branch; also for making the channel of the East Branch 100 feet wide for a length of 8,535 feet, and 50 feet wide for a length of 1,200 feet, with depth of 9 feet, at a total estimated cost of $123,500.

July 1, 1892, nothing had been done under the new project.

During the past fiscal year dredging has been done to widen and deepen the channel of the East Branch and work is now in progress, but not far enough advanced to be of material use.

With the available funds it is proposed to make the East Branch channel 60 feet wide and 9 feet deep at mean low water to or nearly to the head of the harbor.

It is proposed to apply future appropriations to dredging to widen and deepen the channels, as projected.

It is estimated that $108,500 will be required to complete this project and that $50,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS FOR YEAR ENDING JUNE 30, 1892.

Vessels arriving and departing.

[Draft 5 to 12½ feet.]

Kind of vessels.	No. of round trips.
Steamers	1,414
Sailing vessels	461
Barges	313
Total	2,188

Freight received and shipped.

Articles.	Tons.	Estimated value.
Coal	55,421	$251,935
Lumber, baryta, and building materials	36,459	172,139
Miscellaneous	62,727	3,829,249
Total	154,607	4,253,323

Of the above tonnage about 38 per cent belongs to the West Branch and 62 per cent to the East Branch.

HARBOR AT COS COB AND MIAMUS RIVER, CONN.

The harbor is a tidal inlet on the north shore of Long Island Sound extending inland about 2 miles to the village of Miamus. The low water channel is rather narrow, bordered by wide mud flats, and has a depth of 12 feet or over at the entrance, decreasing to 5 feet at the railroad bridge, halfway up the inlet, and thence to Miamus, decreasing to 2 feet.

The project for improvement, adopted in 1892, provides for dredging to make a channel 6 feet deep at mean low water, with 150 feet width to the railroad bridge and thence to Miamus 100 feet width, estimated to cost $36,000.

Work under this project was recently begun, and up to the close of the fiscal year the channel had been made 50 feet wide or more up to the railroad bridge under a contract still in progress. The work is not yet far enough advanced to be a material aid to commerce.

It is proposed to apply future appropriations to extending the dredged channel.

It is estimated that $29,000 will be required to complete the existing project, and that $20,000 can be profitably expended during the ensuing fiscal year.

No commercial statistics have been yet received for 1892.

HARBOR AT BUFFALO, N. Y.

The city of Buffalo, possessing a population of over a quarter of a million, is situated at the eastern extremity of Lake Erie. In population it is the third largest city of New York State, and forms a commercial center of great importance, as is indicated by the figures in the comparative statement below.

The object of the improvements at this point is to protect the entrance to the harbor, to protect the shore south of Buffalo Creek, and to form an outer harbor of refuge where vessels may lie in safety.

To this end the present project (following in the line of the former project of 1826) was adopted in 1874, and provided for the construction of a breakwater of crib work 7,600 feet long, running parallel with the shore, and a shore arm of piles and crib work, 4,100 feet long, running out toward the southern end of the main or detached breakwater, leaving an opening of 150 feet between them.

In 1887 this project was amended so that in the reconstruction of superstructure concrete was substituted for timber crib work.

During the past year the extension of the breakwater and the building of 1,600 feet of the shore arm, under three contracts of 800 feet each, were in progress. In all 9 cribs have been sunk, and 17 more are in various degrees of building. The total amount expended up to June 30, 1892, not including outstanding liabilities, was $2,452,767.67. The amount expended during the fiscal year ending June 30, 1893, was $17,032.62.

July 1, 1892, balance unexpended		$38,903.99
Amount appropriated by act approved July 13, 1892		300,000.00
		338,903.99
June 30, 1893, amount expended during fiscal year		17,032.62
July 1, 1893, balance unexpended		321,871.37
July 1, 1893, outstanding liabilities	$12,533.88	
July 1, 1893, amount covered by uncompleted contracts	272,360.79	
		284,894.67
July 1, 1893, balance available		36,976.70

It is estimated that $146,223.17 will be required to complete the existing project, and that this entire amount can be expended during the fiscal year.

COMMERCIAL STATISTICS.

Receipts by lake for the years ending December 31, 1890, 1891, and 1892.

Articles.	1890.	1891.	1892.	Articles.	1890.	1891.	1892.
	Tons.	*Tons.*	*Tons.*				
Barley	124,000	104,955	110,423	*Grain products.*			
Corn	1,280,000	858,875	939,000		*Tons.*	*Tons.*	*Tons.*
Oats	221,773	199,266	264,000	Flaxseed	75,092	177,029	163,336
Wheat	746,059	2,308,378	2,347,307	Feed	76,851	89,118	110,671
Rye	30,885	156,895	36,863	Malt	7,723	7,945	5,667
Flour	612,067	695,147	955,119	Seeds	4,522	4,673	6,252
				Pease	1,969	6,575	2,015
Lumber.							
				Miscellaneous.			
Lumber	431,001	394,093	448,470				
Timber	404,100	734,716	540,000	Glucose	527	5,641	17,153
Lath	6,850	1,102	2,690	Ice	23,910	.....	.....
Ties	14,783	17,917	23,442	Lard	38,570	10,356	14,876
Staves	970	424	.....	Oatmeal	1,496	872	3,791
Stave bolts	19,155	26,659	21,608	Oil cake	25,555	20,435	27,967
Shingles	12,250	7,484	7,028	Pork	5,590	4,821	3,440
Posts	1,248	2,340	728	Wool	2,821	13,112	6,586
				Exports by lake.			
Metals.							
Copper	39,636	50,934	34,860	Coal, anthracite	2,152,810	2,358,895	2,822,330
Coppe ore	800	200	.....	Coal, Blossburg	5,000	7,000	5,000
Copper matte	40,000	26,420	16,950	Coal, bituminous	.....	.....	25,000
Iron ore	551,940	421,890	224,720	Cement and plaster	11,837	10,580	11,550
Iron pigs	35,910	30,730	46,160	Salt	22,196	23,886	15,242
Lead pigs	424,500	507,970	460,160	Railroad iron	34,287	9,055	13,235

Arrivals and departures of vessels for the year ending December 31, 1892.

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
Steamers	3,426	3,836,394	280	77,492	3,503	3,913,228	262	56,121
Barges	.....	.....	474	65,819	.....	.....	474	65,715
Sailing vessels	1,364	728,725	140	29,560	1,415	758,794	147	31,224
Total	4,790	4,565,119	894	127,871	4,918	4,672,022	883	156,060

Amount of revenue collected during the year ending December 31, 1892, $877,021.81.
Value of exports, same year, $550,113.
Value of imports, same year, $3,801,373.
Increase of tonnage, same year, 2,373.29.
Vessels enrolled at this point, 334.
Greatest draft of vessels, 16 feet.
Principal imports: Sheep, barley, tin plate, dry goods, and lumber.
Principal exports: Manufactured articles of wool and cotton, machinery, etc.

HARBOR AT CANARSIE BAY, NEW YORK.

Canarsie is a small town and summer resort in Kings County, N. Y., about 7 miles southeast of Brooklyn, and just off from Jamaica Bay. It is the terminus of the Brooklyn, Rockaway and Jamaica Bay Railroad, and a favorite resort for yachtsmen. It has also a considerable fishing fleet.

The original condition of the channel leading to Canarsie answered to a depth of 4½ feet, at mean low water.

The original project, adopted in 1879, provides for obtaining a channel 6 feet deep at mean low water from Canarsie landing to the deep water in Jamaica Bay, by means of diking and the formation of a tidal basin, at an estimated cost of $88,000.

There was expended on this project up to June 30, 1892, $47,944.13, and as a result 2 pile dikes have been built and maintained, one on the north side of the outer channel, the other on the south side, the respective lengths of which are 1,058 feet and 820 feet; the channel has been dredged to a depth of 6 feet at mean low water and to a width of 125 feet from Canarsie landing to deep water in Jamaica Bay. In addition to this several other improvements, not contemplated in the main project, but which added materially to the facility of navigation, viz, the excavation of a cut 100 feet long and 50 feet wide, with a depth of 6 feet, on the east side of the steamboat landing at Canarsie, and a cut at the end of the wharf at Canarsie landing extending through to the southwest to connect with the Southwest Channel, the latter for the purpose of promoting tidal circulation.

The work during the fiscal year consisted in dredging the main and west channels to the required dimensions, the former to a width of 150 feet and mean low-water depth of 6 feet and the latter to a width of 60 feet and mean low-water depth of 4 feet, under contract entered into during the spring of 1893. Operations were begun by the contractor May 23, 1893, and were still in progress at the close of the fiscal year, 7,867 cubic yards of material having been removed.

It is estimated that $35,000 will be required to complete the existing project and that $10,000 can be profitably expended during the ensuing fiscal year.

The commerce for the calendar year 1892 is reported to be 67,510 tons against 56,210 tons for 1891.

HARBOR AT CHARLOTTE, N. Y.

Charlotte Harbor is situated on the southern shore of Lake Ontario, at the mouth of the Genesee River, about 7 miles north of Rochester. It is the port of Rochester, that city being situated about 2 miles above the head of the navigable part of river forming the harbor.

The harbor is one of considerable importance, as is indicated in table of commercial statistics attached below.

The object of improvement is to secure a navigable channel at the mouth of the Genesee River, on Lake Ontario, by the construction of piers or jetties about 480 feet apart, connecting the deep water of the river with that of the lake.

The present project, adopted in 1881, is to extend the jetties to the 15-foot curve in the lake, and to dredge a channel between them of navigable width and 15 feet in depth at low water. The natural channel was tortuous, and in calm weather would, at ordinary stages of the lake, admit vessels drawing 8 feet.

The total amount expended from 1828 to June 30, 1893, is $481,679.29. The amount expended from the adoption of the present project in 1881 to June 30, 1893, is $163,600.97.

The total expenditures have resulted in extending the jetties to the 13-foot curve in the lake, and in securing, by dredging, a channel between them 2,700 feet long, 15 feet deep at extreme low water, and 380 feet wide throughout. Lumber, stone, iron, and other material required for extending the west jetty about 500 feet have been purchased during the present fiscal year, and the work of sinking the cribs is now in progress.

The expenditure has also sufficed for the protection, preservation, and repair of existing works, and for the renewal of the perishable portions from the beginning of the work till the present time.

Though the deep water between the jetties is 15 feet, yet, as they have only been extended to the 13-foot curve, the full measure of the improvement is not available and can not be until the project is completed.

During the year 25,220 cubic yards of material has been dredged from the channel, and 3,920 cubic yards from a trench in prolongation of the west jetty, in which 2,558 cubic yards of stone has been deposited to form the foundation of the proposed extension.

It is estimated that $109,650 will be required to complete the existing project and that $75,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Charlotte Harbor, New York, during fiscal year ending June 30, 1893.

ARRIVALS.

Trade engaged in—	Steamers.		Sailing Vessels.		Barges.	
	No.	Registered tonnage.	No.	Registered tonnage.	No.	Registered tonnage.
Home	257	34,076	173	16,521	204	73,079
Foreign	235	110,480	245	47,514	158	57,782
Total	492	144,556	418	64,035	362	130,861
American owned	341	36,643	61	4,967	282	101,497
Canadian owned	151	107,913	357	59,018	80	29,364

Sum total, 1,272 arrivals; 339,452 registered tonnage.

Charlotte Harbor, New York, during fiscal year ending June 30, 1893—Continued.

DEPARTURES.

Trade engaged in—	Steamers.		Sailing vessels.		Barges.	
	No.	Registered tonnage.	No.	Registered tonnage.	No.	Registered tonnage.
Home	354	41,620	50	4,043	182	67,691
Foreign	224	105,939	296	57,487	173	62,113
Total	578	147,559	346	61,530	355	129,804

Sum total 1,279 departures; 338,893 registered tonnage.

Greatest draft of vessels, 14 feet.
Greatest tonnage of vessels, 1,550 registered tonnage.
Greatest load of vessels, 1,920 tons of coal.

Receipts and shipments by lake at Charlotte Harbor, New York, during fiscal year ending June 30, 1893.

RECEIPTS.

Trade.	Passengers.	Grain.	Merchandise.	Live animals.	Poles and ties.	Posts and wood.	Lumber, etc.
	Number.	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*
Home on lake	5,298	993	1,490	.....	.....	.....	.....
Foreign on lake	10,685	1,748	95	1	4,083	7,056	4,900
Total	15,983	2,741	1,585	1	4,083	7,056	4,900

SHIPMENTS.

Trade.	Passengers.	Merchandise.	Grain.	Oil.	Coal.
	Number.	*Net tons.*	*Net tons.*	*Tons.*	*Net tons.*
Home on lake	7,115	80	1,079	.....	178,903
Foreign on lake	9,119	313	.....	26	260,189
Total	16,234	393	1,079	26	439,092

Navigation closed December 3, 1892; navigation opened April 10, 1893.

HARBOR AT DUNKIRK, N. Y.

The city of Dunkirk has a population of over 9,000 and is situated on an indentation of the shore line of Lake Erie. The improvement of this harbor was commenced in 1827, when the first appropriation therefor was made. The original project was much the same as that of the existing improvement, which comprises the formation of an artificial harbor in front of the city by means of a breakwater running nearly parallel with the shore, and a shore arm or pier to the westward, with an opening between the piers and the breakwater. Up to 1832 the breakwater had been completed to a length of 2,564 feet and the pier to a length of 1,400 feet, by an expenditure of $28,489.84.

Various improvements and repairs were made from time to time, and by 1838 there had been completed 2,125 feet of breakwater and 300 feet of detached breakwater. In 1848 the breakwater was demolished.

Between 1848 and 1870 some portions of the work were renewed and others repaired, but in 1870 a board of engineers took into consideration the question of the radical improvement of the harbor. The board

recommended a plan which provided a breakwater 2,860 feet long, one part of which, 2,300 feet in length, was to be nearly parallel with the shore, the other part to be nearly parallel to the axis of the channel entrance, 560 feet long, and terminating at the position of the dumb beacon, and the formation of a channel 170 feet wide and 13 feet deep. Of the 2,300-foot section, 1,341 feet has been completed; none of the 560-foot section has been built.

Work during the year consisted in repairing parts of the breakwater and west pier. These structures are now in fairly good condition and should hold their own for some time. There is a contract for an extension of 250 feet to the breakwater that should be built this year.

The channel requires considerable rock excavation and dredging to make it 170 feet wide, as proposed, and of full depth.

The total amount expended up to June 30, 1892, was $500,017.98, not including outstanding liabilities. The amount expended during the fiscal year ending June 30, 1893, was $10,344.

It is estimated that $128,116.41 will be required to complete this project and that $108,630 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels, 1892 (compiled by the collector of customs, Dunkirk, N. Y.).

Class.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
Steamers	21	3,672	1	281	19	3,656	1	281
Sailing vessels	6	2,161	2	777	8	2,938	.....	.....
Total	27	5,833	3	1,058	27	6,594	1	281

Decrease of tonnage from season of 1891, 11,699 tons.
Amount of revenue collected during year ending December 31, 1892, $1,251.
Greatest draft of vessels, 13 feet.
Value of imports same year, $13,991.
Value of exports same year, none.
No new lines of transportation established.

HARBOR AT FLUSHING BAY, N. Y.

Flushing Bay is on the north shore of Long Island, about 14 miles by water from the battery, New York City. The town of Flushing is on the east bank of Flushing Creek, just above the head of the bay. The bay is about 1 mile wide and 2 miles long; the bottom is of soft mud, nearly level; the depth in the original channel being not much greater than elsewhere. In 1861 a depth of 5 feet at low water was reported in the channel leading up to Flushing. At the beginning of the improvement by the United States the depth there was but 3.9 feet.

The project for improvement, adopted in 1879, contemplated building 16,700 feet of diking, to form a tidal basin which by filling and discharging through the main channel would maintain a channel depth of 6 feet or more at mean low water after once dredging. The estimated cost of this work was $173,500.

A modification of the project in 1888, omitted a large part of the diking as probably unnecessary; and subsequently, in 1891, upon the

request of many citizens, the extension of dikes was wholly omitted from the project.

Up to July 1, 1892, $104,717.36 had been expended in building 4,663 linear feet of diking, and in dredging and redredging to make and maintain a channel of 6 feet depth at mean low water. The channel is of great use to the commerce of Flushing. It will require annual or frequent dredging to maintain it.

During the past fiscal year 31,378 cubic yards of sand and mud were removed, widening the channel at the bend at the south end of the dike and cutting through a shoal near its north end, and in making a cut through a middle ground at the head of the harbor where a few bowlders were also removed. The depth was made about 8 feet at mean low water, in order to maintain a depth of 6 feet for at least a year.

It is proposed to apply future appropriations to dredging, to maintain and widen the 6-foot channel.

It is estimated that $58,500 will be required to complete the existing project, and that $20,000 can be profitably expended during the ensuing year.

COMMERCIAL STATISTICS.

Commercial statistics for 1892 have been asked for, but thus far have not been received. The following table for 1889 is attached. It is thought that the conditions therein contained have not materially differed since the closing of that report.

Arrivals and departures of vessels.

[Draft; 5 to 9 feet: tonnage, 20 to 300 tons.]

Kind.	Number.	Tonnage.
Steamers	830	115,600
Sailing vessels	878	43,200
Barges, etc	732	182,600
Total	2,440	341,400

HARBOR AT GLEN COVE, N. Y.

Glen Cove Harbor is a small estuary or creek opening into the east side of Hempstead Bay, Long Island, about 1¾ miles from Long Island Sound and about 27 miles by water from the Battery, New York City. The channel in the creek is about 2 feet deep at mean low water, and a bar at the entrance has a foot less depth. Vessels entering Glen Cove Harbor have to wait for high tide, anchoring in Hempstead Bay, where they are exposed to storms from the north and northwest. When such storms are heavy it is impossible to tow over the bar, and from this cause vessels have been obliged to remain in the bay for three or four days exposed to heavy seas.

The village of Glen Cove has a population of about 4,000, is a milling and manufacturing town of considerable importance, and is the distributing point of supplies for a large section of farming country. It is distant from New York City about 28 miles. The commercial facilities of this harbor will he greatly benefited by the proposed improvements, and it is thought that the commerce will greatly increase.

The project for improvement, adopted in 1888, provides for a riprap breakwater about 2,500 feet long, extending in a west-southwesterly direction from the northwest corner of the Glen Cove dock, the top to

be 5 feet wide and 3 feet above mean high water. Its estimated cost was $201,960.

Up to July 1, 1892, 1,056 linear feet of the breakwater had been built to a reduced cross section, temporarily adopted, in order to secure more shelter with the available funds. The breakwater made it possible for vessels to use the main landing in all weather, and to wait at anchor for tide high enough to enter the inner harbor of Glen Cove.

During the past fiscal year the breakwater has been raised to a height of 4 feet above high water for nearly its whole length, under a a contract still in progress.

Under this contract the enlargement will be completed and the breakwater farther extended.

It is proposed to apply future appropriations to extending the breakwater, as projected.

It is estimated that $156,960 will be required to complete this project, and that $50,000 can be profitably expended during the ensuing fiscal year.

No commercial statistics of recent date have been received.

GOWANUS BAY, N. Y., RED HOOK AND GOWANUS CREEK CHANNELS.

Gowanus Bay is a part of New York Harbor, lying at the mouth of Gowanus Creek, in the southwestern part of the city of Brooklyn.

The depth of water in the channel of Gowanus Creek and Bay was originally only from 7 to 12 feet at mean low water, which was wholly insufficient for the passage of vessels employed in the commerce of the district.

A project for improvement, adopted in 1881 and modified in 1888, provided for a depth of 21 feet and a width of 400 feet to the channels in the bay leading up to the mouth of the creek on both the north and south sides; and for carrying the improvement with the same depth (and with a gradually decreasing width) up the creek to Hamilton Avenue bridge, a distance of 1 mile, while to facilitate the handling of vessels in the contracted space near the mouth of Gowanus Creek more room was provided for by cutting away the angle on the south side at an estimated total cost of $600,000.

The amount expended on the *Red Hook and Gowanus Creek channels* up to June 30, 1892, inclusive of outstanding liabilities, was $30,081.25. At that date this channel, from the entrance to Erie Basin to Twenty-eighth street, was 230 feet wide and 21 feet deep, mean low water, and thence to the foot of Twenty-third street 150 feet wide and 21 feet deep, mean low water.

The amount expended during the fiscal year ending June 30, 1893, on the Red Hook and Gowanus Creek channels, inclusive of outstanding liabilities, was $2,405.40, and was applied in removing 13,331 cubic yards of material under contract. At that date this channel, from the entrance to Erie Basin to Twenty-eighth street, was 255 feet wide and 21 feet deep, mean low water, and thence to the foot of Twenty-third street 150 feet wide and 21 feet deep, mean low water.

The beds of both channels have been lowered from 5 to 15 feet, and as the material removed has been sand, the banks, having no confining bulkheads, have correspondingly increased their slopes, the unstable material sliding into the channels and reducing their depths.

The channels also suffer from deposits carried down from Gowanus Canal, and from deposits brought in from outlying shoals by the waves.

These sources of degradation will be appreciably exhausted only

when permanent bulkheads are built along both shores to hold the soft and unstable banks.

It is estimated that $281,400 will be required to complete the existing project, and that $250,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The commercial statistics for the fiscal year ending June 30, 1890, have remained practically unchanged, and are therefore herein repeated.

Receipts and shipments for year ending December 31, 1889.

Articles.	Quantity.	Value.
Coal.....tons..	687,000	$2,748,000
Brick.....number..	202,000,000	1,414,000
Lumber.....feet, B. M..	147,000,000	2,940,000
Lime, etc.....barrels..	460,000	690,000
Grain.....bushels..	2,750,000	1,100,000
Ice.....tons..	230,000	805,000
Roofing tar.....barrels..	75,000	225,000
Building stone, etc.....	.....	647,000
Miscellaneous.....	.....	2,500,000
Total.....	.....	13,069,000

Vessels arriving and departing below Hamilton Avenue Bridge.

Class.	Number.	Tonnage.
Steamers.....	46	33,211
Ships.....	68	105,741
Barks.....	489	441,614
Brigs.....	56	17,627
Schooners.....	281	57,392
Total.....	890	655,585

Vessels arriving and departing above Hamilton Avenue Bridge (record of bridge tender).

	Times opened and closed.	Vessels passed through.	Registered tonnage.	Daily average of times opened.
June 1, 1889, to May 31, 1890.....	8,624	7,668	1,430,664	28
1886.....	7,632	6,071	985,431	21
Increase.....	992	1,597	445,233	7

Classification of vessels.

	Number.	Registered tonnage.	Draft.
			Feet.
Schooners.....	1,393	172,738	6–12
Sloops.....	972	62,925	6–10
Barges.....	1,625	409,486	6– 8
Canal boats.....	3,678	785,515	6– 8
Total.....	7,668	1,430,664	.....

The increase in value of receipts and shipments compared with 1887 is $749,000. It is believed that the values as stated in 1887 are too large, and that the true increase is very much larger.

The following table of statistics for Bay Ridge Channel (another channel of Gowanus Bay), which are not included in the foregoing report, is attached as a supplement:

Material.	Value.
Asbestos, cement, paint, and roofing	$2,225,000
Brick and lumber	350,000
Export sugar, machinery and castings	175,000
Petroleum and its products	3,300,000
Phosphates	350,000
Ship and yacht building, dry docks, machine and boiler works, and other industries	1,000,000
Total	7,400,000

There are large factories and piers building along the line of the channel, which will enhance the tonnage and values.

Of larger vessels, such as ships, barks, etc., about 300 have been at the docks. From observation, it is estimated that there are about 1,200 of smaller craft.

HARBOR AT GREAT SODUS BAY, NEW YORK.

Great Sodus Bay is 5 miles long, 2 to 3 miles wide, is deep and landlocked, and is situated midway between Oswego and the Genesee River. It is the coal-shipping port on Lake Ontario for the Pennsylvania Railroad.

The object of improvement is to secure a navigable channel from Lake Ontario to Great Sodus Bay with a depth of 15 feet.

The earliest project for the improvement of this harbor, adopted in 1828, proposed the construction at the mouth of the bay of breakwaters from the east and west shores, approaching to within 500 feet of each other and connected at the opening with parallel jetties extending into the lake.

The subsequent modifications were simply extensions of the original project to adjust it to the increased demands of commerce. The present project was adopted in 1882, the object being to extend the jetties to the 15-foot curve in the lake, and to dredge a channel between them not less than 15 feet deep at extreme low water. The natural channel at ordinary stages would admit vessels drawing 8 feet.

The total amount expended from 1829 to June 30, 1893, is $449,016.35. The amount expended from 1881 to June 30, 1893, is $77,244.61.

The total expenditure has resulted in the construction of a timber breakwater 3,851 feet in length, and of two jetties 1,580 feet and 1,294 feet in length, the west one extending to the 15-foot curve in the lake and the east one to the 10-foot curve.

It has also served for the protection, preservation, and repair of these works from 1829 to the present time, and for dredging from time to time, which has served to maintain a channel of navigable width between the jetties, which has varied at different times from 8 to 15 feet in depth at low water.

The present available depth is not less than 15 feet at extreme low water, but the channel has not yet received the desired width.

The United States dredging plant belonging to this district is now at work here, and the channel will be widened and improved as far as the funds available will allow.

It is estimated that $43,000 will be required to complete the existing project, and that $40,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS FOR 1893.

ARRIVALS.

Trade engaged in.	Steamers.		Sailing vessels.		Barges.	
	No.	Registered tonnage.	No.	Registered tonnage.	No.	Registered tonnage.
Home, on lake	60	2,605	21	2,015	37	12,679
Foreign, on lake	10	703	52	8,158	17	6,422
Total	70	3,308	73	10,173	54	19,101
American owned	65	2,586	17	760	20	4,851
Canadian owned	5	722	56	9,413	34	14,250

Sum total, 197 arrivals; 32,582 registered tonnage.

DEPARTURES.

Trade engaged in—	Steamers.		Sailing vessels.		Barges.	
	No.	Registered tonnage.	No.	Registered tonnage.	No.	Registered tonnage.
Home, on lake	58	2,400	13	384	9	2,239
Foreign, on lake	9	761	62	10,024	45	16,862
Total	67	3,161	75	10,408	54	19,101

Sum total, 196 departures; 32,670 registered tonnage.

Receipts and shipments by lake at Greal Sodus Harbor, New York, during fiscal year ending June 30, 1893.

Trade.	Receipts.					Shipments.		
	Passengers.	Merchandise.	Grain.	Poles and railroad ties.	Lumber.	Passengers.	Merchandise.	Coal.
	No.	*Net tons.*	*Net tons.*	*Tons.*	*Tons.*	*No.*	*Net tons.*	*Net tons.*
Home, on lake	373	.....	142	.....	.....	508	124	4,771
Foreign, on lake	.....	26	.....	692	219	.....	2	55,792
Total	373	26	142	692	219	508	126	60,563

Navigation closed November 30, 1892; navigation opened April 25, 1893.

HARBOR AT LITTLE SODUS BAY, N. Y.

Little Sodus Bay is 2 miles long, three-fourths of a mile wide, is deep and landlocked, and is situated midway between Oswego and Great Sodus, or 13 miles west of Oswego. It is the coal-shipping port on Lake Ontario for the Lehigh Valley Railroad.

The object of improvement is to secure a channel from Lake Ontario into Little Sodus Bay of navigable width and depth not less than 15 feet at extreme low water.

The first project for the improvement of this harbor was adopted in 1829 and has since been variously modified.

The first appropriation was made in 1852. The first project proposed to partially close the opening between the bay and the lake by lateral dikes connected with two parallel jetties extending into the lake.

The present project, which is simply an expansion of the earlier ones, was adopted in 1881 and is designed to afford a channel of navigable width and not less than 15 feet deep at low water by extending

the jetties and dredging between them. The original entrance into the bay had a depth of about 1¼ feet at extreme low water.

The total amount expended from the date of the first appropriation in 1852 to June 30, 1893, is $310,511.42.

The amount expended from the adoption of the present project in 1881 to June 30, 1893, is $66,069.65.

The total expenditure has resulted in the construction of 5,989 feet of dikes and jetties, which completes the dike work and extends the jetties to the 12-foot curve in the lake. It has also served for the protection, preservation, and repair of these works from the time they were built to the present time.

The available depth of water in the jettied channel is about 12 feet at low water. Effort has been made in the past to increase this depth by dredging. The material to be removed consists mainly of hardpan, which proved to be very difficult to excavate. It was not found economical to attempt to remove it with a dredge alone. It will have to be first broken up with explosives.

It is estimated that $52,500 will be required to complete this project, and that $40,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS FOR 1893.

ARRIVALS.

Trade engaged in—	Steamers.		Sailing vessels.		Barges.	
	No.	Registered tonnage.	No.	Registered tonnage.	No.	Registered tonnage.
Home, on lake	53	3,094	38	6,032	22	6,346
Foreign, on lake	27	3,782	81	13,723	95	33,246
Total	80	6,876	119	19,755	117	39,592
American owned	44	1,792	30	2,861	26	7,614
Canadian owned	36	5,084	89	16,894	91	31,978

Sum total, 316 arrivals; 66,223 registered tonnage.

DEPARTURES.

Trade engaged in—	Steamers.		Sailing vessels.		Barges.	
	No.	Registered tonnage.	No.	Registered tonnage.	No.	Registered tonnage.
Home, on lake	48	2,141	14	1,527	23	6,830
Foreign, on lake	32	4,735	106	18,380	94	32,762
Total	80	6,876	120	19,907	117	39,592

Sum total, 317 departures; 66,375 registered tonnage.

Trade.	Receipts.				Shipments.	
	Passengers.	Fish.	Posts.	Lumber, etc.	Passengers.	Coal.
	No.	*Net tons.*	*Tons.*	*Tons.*	*No.*	*Tons.*
Home, on lake	144	.....	.....	79	179	4,740
Foreign, on lake	.....	16	666	800	.....	95,023
Total	144	16	666	879	179	99,763

Navigation closed November 29, 1892; navigation opened April 20, 1893.

HARBOR AT OGDENSBURG, N. Y.

The city of Ogdensburg, N. Y., is located on the St. Lawrence River, at the mouth of the Oswegatchie River. The prosperity of the city is chiefly derived from trade and extensive manufactures of flour, lumber, machinery, leather, etc. It has a population of about 12,000.

The improvement of this harbor has been carried on under three successive projects, covering substantially the same area, but providing for a progressive deepening to meet the increasing demand of commerce for draft of water. The last of these projects now in progress of execution was adopted in 1890, and contemplates the deepening of the channels leading from the deep water of the St. Lawrence River and along the city front to 16½ feet at extreme low water, at an estimated cost of $158,950. Prior to improvement, depths of 5 to 12 feet prevailed along the city front. There is now a channel 150 feet wide with a clear depth of 16½ feet at extreme low water along the greater part of the city front, with two entrances of equal or greater depth from the river.

The completion of a contract now pending will extend the channel with the same dimensions to and across the mouth of the Oswegatchie River and deepen a third entrance at the upper end.

All moneys appropriated, not heretofore expended, are pledged under the present contract.

It is estimated that $70,000 will be required to complete the existing project, and that $70,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Tonnage of vessels entered and cleared, foreign ports, and coastwise, 1892.

	East of Ogdensburg.				West of Ogdensburg.			
	American vessels.		Foreign vessels.		American vessels.		Foreign vessels.	
	Entered.	Cleared.	Entered.	Cleared.	Entered.	Cleared.	Entered.	Cleared.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Foreign ports	7 913	2,612	20,863	11,741	15,044	7,906	21,359	28,277
Coastwise	2,776	2,746	.....	.....	317,085	309,028	.....	.....

Merchandise received and shipped, foreign ports.

Articles.	Tons.
Received:	
Lumber	9,647
Barley, etc	9,760
Hay	10
Miscellaneous freight	15,276
Shipped:	
Coal	34,090
Cheese	2,036
Oil	570
Miscellaneous freight	11,226
Wheat	3,880
Sugar	792
Total	87,287

Merchandise received and shipped, coastwise.

Articles.	Tons.
Received:	
Lumber	69,992
Grain	171,336
Flour	30,146
Coal	149,438
Miscellaneous freight	3,431
Bran	47,826
Shipped:	
Miscellaneous freight	66,390
Total	538,559

Total duties collected	$167,560.28
Total fees collected	2,474.65
Value of imports	1,673,129.00
Value of exports	1,196,882.00
Value of merchandise entered for warehouse and transshipped in bond	58,477.00
Valued of merchandise entered for transshipment and export	279,123.00
Amount of duties on the above	110,566.69

Merchandise received under consular seal from foreign ports, 1892.

Articles.	Packages.	Value.
Tea	59,746	$542,422
Curios	2,072	59,108
Raw silk	86,437	4,474,830
Silk goods	1,574	913,616
Straw braid	866	14,055
Chinese groceries	2,114	28,008
Firecrackers	2	50
Copper matte, pounds	5,524,877	290,066
Skins	204	61,362
Miscellaneous articles	2,978	50,530
Total	.....	6,434,047

HARBOR AT OSWEGO, N. Y.

Oswego, N. Y., is situated at the mouth of the Oswego River, on the southeast shore of Lake Ontario. With the exception of Toronto, Canada, it is the largest city on this lake. It possesses a population of about 22,000, and is one of the foremost cities of the United States in the manufacture of flour.

Oswego is the northern terminus of the Oswego Canal, which connects at Syracuse with the Erie Canal, and rail connection is also provided by the half dozen railroads reaching west, south, and east. The steamers of the Canadian Transportation Company ply daily between this port and Montreal, and propellers of another line depart every morning for the West. Some dozen elevators transship the great quantities of grain arriving and departing daily.

Originally the entrance to the mouth of the river was shallow and difficult of access, and the object of improvement was to give protection to the city docks and wharves, to the commerce of the harbor, and to make a depth suitable for the heaviest draft vessels on the lakes.

Various projects to effect these purposes have been adopted and completed since 1827, when operations were first commenced.

The most recent, that of 1888, was designed to remove the east breakwater, partially constructed by the plan of 1882, and, as the funds available were sufficient for the purpose, this was successfully accomplished during the following year.

The total expenditure to June 30, 1893, amounting to $1,786,812.75, has resulted in the completion of the original project of 1827, and in the construction of the outer west breakwater; the reduction to 350 feet of the opening between the east end of this breakwater and the north end of the light-house pier, the construction and removal of about 250 feet of the east breakwater, the completion of two spur cribs and the deepening of the river mouth to a depth of 15 feet at low water; in the securing full protection to the dock and wharves west of the river mouth, and channels of entrance 16 feet deep and 350 feet wide to the inner and outer harbors, and in securing increased depth in the inner harbor.

In addition, the various works have been cared for and maintained, and the perishable portions renewed, when necessary, from the beginning of the work in 1829 to the present time.

The operations of the fiscal year have been the renewal of the superstructure on the light-house pier extension, in the parapet form, for a length of about 342 feet; leaving about 90 feet to be done in order to complete it. This will be done this season.

There has already been removed from the harbor near the river mouth about 2,500 cubic yards of solid rock measured in place. This will enable vessels drawing 15 feet to reach at the lowest stage of the lake a coal trestle and elevators before inaccessible.

It is estimated that $85,000 will be required to complete this project and that that entire amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Oswego Harbor, New York, for the fiscal year ending June 30, 1893.

ARRIVALS.

Trade engaged in.	Steamers.		Sailing vessels.		Barges.			
					On lake.		On river.	
	No.	Registered tonnage.	No.	Registered tonnage.	No.	Registered tonnage.	No	Registered tonnage.
Home, on lake	304	90,937	208	26,897	57	12,879	.....	.....
Home, on river	84	9,126	.....	.....	.....	.....	568	77,520
Foreign, on lake	463	110,008	663	120,691	347	94,965	.....	.....
Total	851	210,071	871	147,588	404	107,844	568	77,520
American owned	516	152,137	236	37,453	143	32,422	568	77,520
Canadian owned	335	57,934	635	110,135	261	75,422	.....	.....

Sum total, 2,694 arrivals; 543,023 registered tonnage.

DEPARTURES.

Trade engaged in.	Steamers.		Sailing vessels.		Barges			
					On lake.		On river.	
	No.	Registered tonnage.	No.	Registered tonnage.	No.	Registered tonnage.	No.	Registered tonnage.
Home, on lake	376	142,016	247	37,511	88	22,352	.....	.....
Home, on river	84	9,126	.....	.....	.....	.....	568	77,520
Foreign, on lake	388	59,130	632	109,214	304	82,375	.....	.....
Total	848	200,272	879	146,725	392	104,727	568	77,520

Sum total, 2,687 departures; 529,244 registered tonnage.

Receipts and shipments by lake and river at Oswego, N. Y., for the fiscal year ending June 30, 1893.

RECEIPTS.

Trade.	Passengers.	Grain.	Coal.	Merchandise.	Fish.	Lumber, etc.
	No.	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*
Home, on lake	1,371	21,697	1,086	1,856	2	46
Home, on river	.....	2,828	10,032	16,773	.....	68,415
Foreign, on lake	520	20,509	.....	.....	.....	194,341
Total	1,891	45,034	11.118	18,631	2	262,802

SHIPMENTS.

Trade.	Passengers.	Grain.	Coal.	Merchandise.	Oil.	Lumber, etc.
	No.	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*
Home, on lake	4,648	.....	219,896	2,460	36	8
Home, on river	.....	23,475	3,151	7,626	.....	52,260
Foreign, on lake	345	.....	315,704	2,022	15	.....
Total	4,993	23,475	538,751	12,108	51	52,268

Navigation closed December 20, 1892; navigation opened April 5, 1893. Total revenue collected at port during fiscal year, $284,058.60.

HARBOR AT RONDOUT, N. Y.

The population of the city of Rondout is about 25,000.

The harbor is formed by the mouth of Rondout Creek, which empties into the Hudson River on its west side about 90 miles above the city of New York, and is the eastern terminus of the Delaware and Hudson Canal. The creek is a tidal stream for 3 miles above its mouth, and prior to 1871 all improvements had been made by private parties. The range of tides is 4 feet, approximately.

The Government made a survey of the harbor in 1869, and the available depth of water then in the channel was 7 feet at mean low water. The project of improvement, based on this survey, was for the formation and maintenance of a channel 100 feet wide and 14 feet deep, mean low water, at the mouth of the creek, to be obtained by means of dikes and dredging. The parallel channel dikes, 350 feet apart at the entrance, were to be built outward into the Hudson River, and a branch dike upstream, starting at outer end of north pier, to protect the north dike against destruction by ice.

The estimated cost of the project was $172,500.

The project was completed in 1880 at an actual cost of $90,000 only. At that time the length of the north dike was 2,200 feet, and that of the south dike 2,800 feet, and there was a channel between them 50 feet wide and 13½ feet deep, mean low water, and 100 feet wide and 12 feet deep, mean low water.

The appropriations which have been made since 1880 have been applied exclusively to the repair of the dikes.

The amount expended upon the project and upon repairs up to the close of the fiscal year ending June 30, 1892, inclusive of outstanding liabilities, was $106,500, at which date the navigable channel was 100 feet wide and from 12½ to 13½ feet deep, mean low water. The dikes were built originally of timber and stone to the height of mean high

water, but the timber has since become so damaged by age and by the ice that the stone filling in many places has fallen out from between the rows of piles, and the height of the dikes has been correspondingly lowered.

The amount expended during the fiscal year ending June 30, 1893, inclusive of outstanding liabilities, was $2,927.67, and was applied in repairing the north branch and south dikes, by replacing worn and decayed timber and refilling with stone. The repairs were still in progress at the close of the fiscal year.

The improvement is in fair condition, but annual repairs to the dikes will be required.

It is estimated that $15,000 will be required for the completion of the existing project, and that $5,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The commercial statistics of this harbor have not changed materially since report for 1890, at which time there was a total tonnage of 2,467,490 tons, valued at $41,268,850. General merchandise, coal, cement, lime, bluestone, and ice are the principal products handled, and are carried in about 700 vessels, which also carry 75,000 passengers annually.

Of the above tonnage one-half passes through the Delaware and Hudson Canal, which connects the Hudson River at Rondout with the Delaware River at Port Jervis, N. Y., and with Honesdale, Pa., the heart of the Pennsylvania coal region.

HARBOR AT NEW YORK, N. Y.

New York Harbor is the name applied to the waters surrounding the city of New York, comprising parts of the Hudson, East, and Harlem rivers, and the upper and lower bays lying respectively inside and outside of the Narrows, and between the Long Island, Staten Island, and New Jersey shores.

The city of New York, from which the harbor takes its name, lies at the mouth of the Hudson River at its junction with the East River; and with the adjacent cities of Brooklyn and Jersey City, which are but the natural outgrowths of New York energy and enterprise, includes a population of nearly 3,000,000 inhabitants, which is more than the population of any State in the Union, excepting New York, Pennsylvania, Ohio, Illinois, and Missouri.

At this port two-thirds of the merchandise imported into the United States is received, and two-thirds of the import duties are collected. From this port are sent one-half of the domestic products of the country which are exported, and here one-half of the foreign tonnage trading with the United States enters. Three-fourths of the passengers traveling between the United States and foreign countries come and go by the way of New York, and three-fifths of all immigrants land at this port.

New York Harbor has two entrances—one by the East River and Hell Gate, leading into Long Island Sound, used chiefly by vessels trading between New York, the Eastern States, and British American Provinces; the other, which is the main entrance, leading out through the Narrows, by Sandy Hook, directly into the Atlantic Ocean, and used by all the transatlantic steamers and vessels.

The Hell Gate entrance has been in course of improvement since 1869, and with its successful completion—which is now assured within a few years—and with the steady growth of the city towards the north it must come, more than ever, into use by foreign-bound vessels.

The main or Sandy Hook entrance into New York Harbor is one of the best in the world. The channel prior to 1884 was less than 24 feet deep at mean low water and nearly 29 feet at mean high water, with

abundant breadth, and was ample for all the commercial requirements of the port until the great increase in the length, tonnage, and draft of the transatlantic passenger steamers made further deepening necessary in order to prevent the delays to which they were subjected by having to wait for high water in order to pass either in or out.

Before the improvement of the Main Ship Channel into New York Harbor was undertaken by the United States it was obstructed by four shoals, as follows:

1. The outer bar, about 4,000 feet wide, the channel across which is known as Gedney Channel, where there were depths of 23.7 feet in midchannel and 22.3 feet in the southern half.

2. The shoal at the mouth of the Swash Channel, about 4,000 feet wide, where the depth was 24.3 feet.

The channel across this shoal has been named the Bayside Channel.

3. The shoal northwest of Sandy Hook, about 2,000 feet wide, on which the least depth was 26.2 feet.

4. The shoal in the Main Ship Channel in the Lower Bay, west of Flynn Knoll, nearly 3 miles long, on the crest of which the depth was only 23.9 feet in midchannel, with depths of 22.6 feet within a few hundred feet of the midchannel range.

A large proportion of the vast commerce of the port, which was carried on in vessels of great draft, could only cross these shoals at or near high water.

The project for the improvement of Gedney Channel was approved by the Secretary of War in December, 1884, and its extension to cover the whole of the main entrance to the harbor received his approval December 27, 1886. It provides for dredging a channel 1,000 feet wide and 30 feet deep at mean low water, from deep water below the Narrows through the main ship channel and Gedney Channel to deep water outside the bar; maintaining this channel, should it be necessary, either by periodical dredging or by contracting the entrance by the construction of a dike running across the shoals from the Coney Island side, with suitable protection for the head of Sandy Hook to prevent its being scoured away by the increased current.

The estimated cost of obtaining the dredged channel was $1,490,000 for dredging 4,300,000 cubic yards, and the entire cost of the improvement should the construction works prove to be necessary was estimated at between $5,000,000 and $6,000,000.

Under this project an extended survey of the lower bay was made, on which the method of improvement was based.

The total amount expended to June 30, 1892, inclusive of outstanding liabilities, was $1,465,259.38.

At that time the approved project for this work, by dredging, had been completed and a depth of 30 feet, mean low water, for a channel width of 1,000 feet, had been secured from deep water below the Narrows to deep water beyond the bar.

The riprap sea wall authorized by the Chief of Engineers February 20, 1890, for the protection of the north shore of Sandy Hook was built from Jetty No. 1, westward to a point 119 feet westward of Jetty No. 11, a total distance of 2,575 feet.

Baxter Ledge, a narrow ledge of rock lying in the entrance to Kill Van Kull from Upper New York Bay, northeast from St. George, Staten Island, and having over it originally a least depth of 18 feet mean low water, had been removed to a depth of 25.5 feet mean low water.

The amount expended during the fiscal year ending June 30, 1893, inclusive of outstanding liabilities, was $116,371.72, and was applied to the purchase, under contract, of the hydraulic dredging steamer

Reliance (now named *Gedney*), formerly employed on this work, to operating the steamer by hired labor and to connecting the wharves at Fort Hamilton and Fort Wadsworth with the main ship channel by dredging channels 100 feet wide and 10 feet deep.

The Chief of Engineers estimates that $100,000 can be profitably expended in this harbor during the ensuing fiscal year.

HARBOR AT SAUGERTIES, N. Y.

This harbor is formed by the mouth of Esopus Creek, which empties into the Hudson River on the west bank about 100 miles above New York City.

Prior to the Government improvement the entrance to this harbor was obstructed by a bar which was passable for the smallest classes of vessels only at high tide, the depth on the bar being 3 feet at mean low water for a distance of 1,100 feet between the six-foot curves across it.

The plan of improvement which was adopted in 1887 provided for securing a depth of 8 feet, mean low water, from the entrance to the head of navigation, $1\frac{3}{4}$ miles, by the construction of two parallel dikes, each 2,300 feet long, 260 feet apart on the inside and 280 feet apart on the outside, and by dredging, if found necessary, 30,000 cubic yards of material from the channel between the dikes.

The estimated cost of the improvement was $52,000; the amount expended upon the project up to the close of the fiscal year ending June 30, 1892, inclusive of outstanding liabilities, was $41,407.06. At that date both dikes had been completed; the north dike had then a length of 2,058 feet and the south dike a length of 2,363 feet, and the waterways between them was 260 feet wide, and the navigable channel had been deepened by dredging for a width of 150 feet between 9-foot curves.

The amount expended during the fiscal year ending June 30, 1893, inclusive of outstanding liabilities, was $2,930.95, and was applied in repairing the timber work of the south dike and refilling of both dikes with stone where settlement had taken place, and in removing, by hired labor, by use of the drill scow *Hudson*, several bowlders from the channel near the shore end of the jetties and removing the rocky reef at Barclays Point.

The existing channel from the entrance to the head of navigation is 150 feet to 300 feet wide and 9 feet deep at mean low water.

It is estimated that $5,000 will be required to complete the existing project, and that that entire amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The commercial carriers are 5 steamboats for freight and passenger traffic, owned by the Saugerties and New York Steamboat Company, the Saugerties and Albany line, and the Saugerties, Rondout and Hudson line, and 405 sailing and other craft, the former carrying 17,000 passengers annually, and in all aggregating 189,000 tons of freight, valued at $5,484,000, the principal products being general merchandise, bluestone, coal, and lumber.

The population of Saugerties is 5,000.

HARBOR AT PORT CHESTER, N Y.

This harbor consists of the lower part of the Byram River and a bay at its mouth opening into Long Island Sound. The river, for about $1\frac{1}{2}$ miles from its mouth, forms the boundary line between the States of New York and Connecticut. It was formerly navigable to within a few

hundred feet of the bridge at Port Chester, a little more than a mile above the mouth.

The original available depth in the river was not more than a foot at low water, and Salt Rock in the river and Sunken Rock in the bay were considered dangerous obstructions.

The project for improvement, adopted in 1871, provided for the removal of these rocks to 9 and 11 feet depth, respectively, and for the construction of a breakwater at Byram Point, at the mouth of the harbor, the estimated cost being $96,632.

In 1884 the project was extended to provide for dredging a channel 2½ feet deep and from 60 to 100 feet wide from the bay to the vicinity of the village warves.

In 1888 the project was further modified to omit the removal of Sunken Rock, and to build a breakwater from that rock to Byram Point, which should also serve as a beacon on the rock. A revised estimate, made in 1890, in accordance with the modification, reduced the cost of completion by about $40,000.

Up to July 1, 1892, $36,387.98 had been expended in removing Salt Rock to 9 feet depth, in dredging a channel 2½ feet deep and from 60 to 100 feet wide to within 150 feet of Port Chester Bridge, with 25 feet width to the bridge, and 585 linear feet of the breakwater from Sunken Rock to Byram Point had been constructed.

The dredging and rock removal have resulted in admitting safely vessels of greater draft than formerly. The partial completion of the breakwater has served to mark Sunken Rock and to shelter a small anchorage area at the mouth of the river.

During the past fiscal year the breakwater has been extended partly to high water on Byram Point, under a contract still in progress.

It is proposed to apply future appropriations to completing the breakwater and to maintaining or enlarging the dredged channel.

It is estimated that $15,000 will be required to complete this project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR 1891.

Arrivals and departures of vessels.

[Draft, 5½ to 9 feet; tonnage, 25 to 300 tons.]

	No. of round trips.	Tonnage.
Steamers	550	60,000
Sail vessels	400	22,000
Barges	600	125,000
Total	1,550	207,000

Freight received and shipped by water.

	Tons.	Estimated value.
Receipts	143,000	$1,100,000
Shipments	28,000	900,000
Total	171,000	2,000,000

The above figures show an increase in tonnage of freights since 1890 of 11,000 tons.

The principal articles of commerce by water are manufactured goods, coal, iron, farmers' produce, and general merchandise.

TONAWANDA HARBOR AND NIAGARA RIVER, NEW YORK.

Tonawanda Harbor, on the Niagara River, 11 miles below Buffalo, where the Erie Canal leaves the river, is regarded as the foot of navigation upon the Niagara River above the Falls.

Tonawanda is especially known as a lumber port, ranking next to Chicago among the lake ports in this respect, and improvements now under way have materially increased this business. The location of several large manufacturing interests at or near this point has contributed to some considerable extent to the maintenance and increase of its commerce.

The object of improvements at this point is to provide a navigable channel from the entrance to the Niagara River at Lake Erie to the north end of Tonawanda Harbor.

The project provides for the removal of obstructions so as to make a channel 400 feet wide and 18 feet deep, which includes work at the following places:

1. On the reef known as Horseshoe Reef, at the entrance of Niagara River.
2. On the shoal place at the head of Strawberry Island.
3. A few shoal places abreast of the lower end of Rattlesnake Island.
4. The full width of the river between Tonawanda Island or Whites Island and the main land along the entire front of Tonawanda.

This project was approved in 1888.

The work of the year has consisted in dredging the harbor of Tonawanda to the full depth of 16 feet throughout and in continuing the removal of the rock bottom that is above grade in the channel of the Horse Shoe Reef. Contracts exist for continuing the work at this point and in the channel near Strawberry Island. The amount expended up to June 30, 1892, not including outstanding liabilities, was $148,857.61. The amount expended during the fiscal year ending June 30, 1893, was $30,878.90.

It is estimated that $1,008,090.16 will be required to complete the existing project, and that $200,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Receipts by lake for the years ending December 31, 1890, 1891, 1892.

Articles.	1890.	1891.	1892.
Lumber ..... tons..	1,076,475	758,268	747,006
Shingles ..... do....	8,705	8,760	7,135
Lath ..... do....	2,608	1,642	1,248
Pickets ..... do....	.....	.....	1,376
Posts ..... do....	823	.....	.....
Timber ..... do....	52,500	.....	.....
Railroad ties ..... do....	.....	8,096	16,332
Iron ore ..... do....	.....	.....	85,772
Pig iron ..... do....	.....	.....	1,440
Limestone ..... do....	.....	.....	7,728
Pulp wood ..... do....	.....	.....	675
Vessels entered	1,422	1,331	1,181
Vessels cleared	1,402	1,119	1,175
Duties collected on foreign lumber	$134,429.43	$72,948.02	$40,499.15
Tonnage entered	584,400	460,627	484,038
Tonnage cleared	578,667	455,115	473,997

CHANNEL BETWEEN STATEN ISLAND AND THE NEW JERSEY SHORE, NEW YORK AND NEW JERSEY.

The channel between Staten Island and the New Jersey shore is a tidal sound or strait, one part of which passes north of Staten Island, connecting New York Harbor with Newark Bay, while the other part passes west of Staten Island, connecting Newark Bay with Raritan Bay at Perth Amboy. Its total length, including the mouth of Newark Bay, is about 16 miles.

Before this improvement was undertaken by the United States there was a navigable channel, having a minimum depth of 9.2 feet from the deep water in Newark Bay to Elizabethport.

The first project for the improvement of this channel was adopted in 1873. This provided for dredging to a depth of 16 feet for a width of 150 feet at its shallowest part, and protecting the cut by parallel dikes. The estimated cost of this was $443,210. Fifty thousand dollars of this amount, appropriated in 1874, was spent in 1874–'75 in the construction of 2,237 feet of the south dike, opposite Elizabethport.

Great opposition being made to this plan, it was decided to modify it, and the project was therefore changed in 1880 so as to dredge a channel 400 feet wide and 13 feet deep over the middle 200 feet of its width, leaving it but 12 feet deep over the remaining widths of 100 feet on each side. The estimated cost of this work was $125,705. In addition to this it was proposed, should it be found necessary, to build four detached dikes along the line of the channel, two on the north and two on the south side, the estimated cost of which was $60,000, bringing the total estimated cost of the proposed improvement up to $185,705. Subsequently it was decided to give the channel 13 feet depth for its full width of 400 feet.

A modification of this project, having in view the abandonment of the dikes, was submitted May 9, 1889, and approved by the Department, and a further modification, calling for a uniform channel depth of 14 feet at mean low water over the entire width of 400 feet, was approved October 20, 1890.

The amount expended to June 30, 1892, was $197,276.38.

With this amount 2,237 feet of dike was built, the channel dredged throughout its entire projected length to a mean low-water depth of 13 feet, with widths varying from 300 to 350 feet, and in the vicinity of the bend at the Corner Stake Light, for a distance of 3,000 feet, the width had been increased to 400 feet, with mean low-water depths of from 13 to 14 feet.

An appropriation of $15,000 was made in the river and harbor act of July 13, 1892, and a project for its expenditure in dredging the channel to the required dimensions was approved July 26, 1892.

No work has been done during the fiscal year, operations under the above project having been deferred until a survey is made, and the most appropriate localities for the expenditure of the appropriation thereby determined. It is also expected that a more advantageous letting of the work can be had later in the season.

The amount of commerce reported for the calendar year 1892 is 3,643,914 tons, against 9,219,481 tons for 1891.

It is estimated that $46,000 will be required to complete the existing project and that $30,000 can be profitably expended during the ensuing fiscal year.

ARTHUR KILL, BETWEEN STATEN ISLAND AND THE NEW JERSEY SHORE, NEW YORK AND NEW JERSEY.

This improvement, which originated in the Senate Committee on Commerce, provides for the removal of a point of land near and to the south of the Staten Island bridge, for the purpose of straightening the channel, in order that the currents may be directed more truly in a direction perpendicular to the draw span of the bridge, thus facilitating the passage of long tows.

The first appropriation for this work was made in 1888, and amounted to $10,000. Some difficulty was at first encountered in securing title to the property, by the removal of which the United States undertook to accomplish this improvement, but condemnation proceedings for this purpose were perfected in the United States court for the eastern district of New York on November 8, 1889, and work has since satisfactorily progressed.

Up to June 30, 1892, there had been expended $16,245.59 in acquiring land and in dredging off about 1 acre of the point, with a resulting increase of 210 feet in the channel width and uniform mean low-water depth of 13 feet, where the land was originally 6 feet above that plane.

The expenditures during the fiscal year ending June 30, 1893, amount to $4,845.15, with which the channel was given an additional width of from 15 to 60 feet and mean low-water depth of 13 feet, one-third acre of the land removed, making a total of about $1\frac{1}{3}$ acres removed under the project, giving a total channel width at this point of not less than 725 feet.

The commerce for the calendar year 1892 is reported to be 4,835,004 tons, against 6,947,635 tons for 1891.

It is estimated that $4,500 will be required to complete the existing project and that that entire amount can be profitably expended during the ensuing fiscal year.

HARBOR AT HUNTINGTON, N. Y.

This is a tidal inlet, extending southward from Huntington Bay to the village of Huntington. It is about 2 miles long, quite narrow and landlocked, and has a natural available depth of nearly 8 feet at mean low water, up to within three-fourths of a mile of the head of the harbor, where the low-water depth shoaled gradually to zero.

In 1872–'73 a channel 3 feet deep and 150 feet wide was dredged in the upper part of the harbor by the United States at a cost of $22,500. Within ten years following this had nearly filled up.

In 1884 a survey was ordered by Congress, and subsequently a project for improvement was adopted providing for redredging a channel 8 feet deep and 100 feet wide up to the upper wharves, at an estimated cost of $42,000. The estimate also includes a pile protection for part of the channel, but it seems probable that equally good results can be obtained by applying the funds to dredging a greater width.

July 1, 1892, the channel had been made 8 feet deep at mean low water, and 90 feet wide for a length of 2,900 feet, extending nearly to the upper landings. This channel was generally used by the commerce of the harbor, and delays waiting for high tide were reduced or wholly avoided.

During the past fiscal year the channel has been maintained and widened to 105 feet up to the bend at the steamboat landing, and the width at the bend was made 185 feet.

It is proposed to apply future appropriations to dredging to maintain and further widen and extend this channel.

It is estimated that $17,000 will be required to complete the existing project, and that $10,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR 1892.

Arrivals and departures of vessels.

[Draft, 5 to 8 feet; tonnage, 70 to 400 tons.]

Kind of vessels.	No. of round trips.	Tonnage.
Steamers	195	78,000
Sailing vessels	420	75,600
Barges	12	5,376
Total	627	158,976

Freight received and shipped by water.

	Tons.	Estimated value.
Receipts	31,000	$650,000
Shipments	13,000	270,000
Total	44,000	920,000

The Chief of Engineers incorporates in his report the following extract of a letter accompanying the foregoing table of commercial statistics:

The deepening of the channel has enabled the daily steamer from here to New York City to make landing a half mile or more farther up the harbor, and so much nearer the center of population and business—a great saving in time and money as to passengers and freight. In the lumber and coal business on the east side freight is now landed at the yards from the vessels, where formerly it had to be taken by lighters—a great saving. Vessels large and small now arrive and depart from the upper docks, while before the improvement they had to await the rise of tide, and the accruing advantages are very great. Our people are greatly pleased with the work that has been done. It is, however, greatly desired that the channel may be widened as a protection against filling in from the sides and safety and convenience of navigation.

BUTTERMILK CHANNEL, NEW YORK HARBOR, NEW YORK.

Buttermilk Channel lies between the city of Brooklyn, N. Y., and Governors Island, New York Harbor, and was formerly obstructed by 3 shoals.

(1) A shoal lying above and northeast of Governors Island, projecting into Buttermilk Channel and extending over to the main channel on the other side, which originally had a least depth over it of 9½ feet at mean low water.

(2) A shoal putting out from Red Hook Point, on the Brooklyn side, and extending up the eastern side of the channel to the entrance of the Atlantic Basin, with a least depth over it of about 6 feet at mean low water.

(3) A shoal putting out from the southern side of Governors Island and extending toward Red Hook Point Shoal, which is partly dry at mean low water.

The original project of improvement, adopted in 1880, provided for the removal to a depth of 26 feet, mean low water, of such parts of

the first-mentioned shoal as came within 850 feet of the Brooklyn wharves. It embraced the crest of the shoal and gave elsewhere to the north and west a depth of not less than 15 feet, mean low water.

The estimated cost of the improvement was $210,000. In view of the increasing importance of the wharves on the Brooklyn shores and the difficulty experienced by deep-draft vessels in getting up to them by reason of this shoal, the project of improvement was modified in 1885 so as to provide for the removal of the entire shoal to a depth of 26 feet, mean low water, at an estimated additional cost of $150,000, making the total estimated cost of the project $360,000.

The river and harbor act of September 19, 1890, made provision for the survey of Red Hook Shoal, lying at the southern entrance to the Buttermilk Channel, and the estimated cost of the removal of this shoal to a depth of 26 feet at mean low water was $529,000.

The amount expended to the close of the fiscal year ending June 30, 1892, inclusive of outstanding liabilities, was $321,506.75, and was applied in dredging the shoal lying above Governors Island. The shoal had been entirely removed to a depth of 26 feet, mean low water.

The amount expended during the fiscal year ending June 30, 1893, inclusive of outstanding liabilities, was $12,821.24, and was applied in dredging 32,308 cubic yards of material from Red Hook Shoal.

The line of docks and wharves from the Brooklyn Bridge down to the mouth of the Atlantic Basin on the Brooklyn side is one of the most important in the New York Harbor, and this part of the river, extending from the Brooklyn Bridge to Governors Island, was formerly regarded by pilots and masters of vessels as one of the most difficult places in New York waters to carry a vessel through safely on account of this shoal, the rapid current, and the enormous traffic passing not only up and down but across the stream.

Tows, tugs, small steamers, and small craft generally, in passing up and down this part of the East River, keep to the New York side, forcing the larger class of sound steamers, ocean steamers, and seagoing ships in tow of tugs to keep over towards the shoal at the upper point of Governors Island, and if, as was often the case, these vessels were obliged to stop in order to avoid collision with ferryboats, sloops, and canal-boat tows, they were liable to drift upon this shoal.

The commerce of Buttermilk Channel is so intimately connected with that of New York Harbor that it is impracticable to accurately determine its amount and value, but it is known that during the year 1890 3,957 vessels with a tonnage of 2,017,348 tons loaded and unloaded at the Brooklyn wharves immediately fronting on the channel.

It is estimated that $404,000 will be required to complete the existing project, and that $200,000 can be profitably expended during the ensuing fiscal year.

HARBOR AT PORT JEFFERSON INLET, N. Y.

The village of Port Jefferson, with a population of 3,000, lies at the head, or south end, of this harbor. The harbor is on the north shore of Long Island and about 50 miles east from New York City. It is a mile long and averages three-quarters of a mile wide, and a large part of the area has depths of 18 feet or more at low tide. Tributary to this harbor, on the west, are Setauket Harbor and Conscience Bay, two shallow tidal basins. Port Jefferson Harbor is surrounded on three sides by hills, and is separated from Long Island Sound on the north by a beach of sand and gravel, through which, and nearly in the axis

of the harbor, is a single entrance 400 feet wide. This entrance is Port Jefferson Inlet, and through it a tidal reservoir of 2 square miles area receives and discharges some 300,000,000 cubic feet of water with every tide, producing a current whose maximum velocity exceeds 4 miles per hour. In the narrow part of the inlet the depth has always been considerable, but a short distance out into the sound was a broad, flat bar, which originally had a depth of 4 feet at low water. Until the beginning of Government improvement, in 1871, the location of this inlet

Under a project adopted in 1871, and modified in 1873 and 1877, an east jetty 1,390 feet long, and a west jetty 940 feet long, were built, both with scant cross section, and a channel 8 feet deep and 100 feet wide was dredged through the bar. The work was completed in 1883, at a total cost of $79,000.

By order of Congress an examination of Port Jefferson Inlet was made in 1888, and subsequently a project was adopted for repairing and enlarging the jetties and dredging to make the channel 10 feet deep and 200 feet wide, at an estimated cost of $90,000.

Under the existing project up to July 1, 1892, $15,867.25 (including outstanding liabilities) had been expended in raising and enlarging part of both jetties, and in beginning dredging between them. The dredging was not sufficiently advanced to realize any material advantage.

During the past fiscal year dredging has been done to widen the channel and a cut has been made through the inlet; this makes an available depth of 10 feet at mean low tide to the inner harbor. The channel is yet very narrow, the work is in progress, and under the existing contract the width will be made about 150 feet.

It is proposed to apply future appropriations to dredging and to enlarging the jetties.

It is estimated that $55,000 will be required to complete the existing project and that $35,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR 1892.

Arrivals and departure of vessels.

[Draft, 4 to 13 feet; tonnage, 15 to 438 tons.]

Kind of vessels.	No. of round trips.	Total tonnage.
Steamers	582	49,770
Sail vessels	761	29,300
Barges	6	732
Total	1,349	79,802

Freight received and shipped by water.

	Tons.	Estimated value.
Receipts	34,800	$1,028,000
Shipments	12,800	135,000
Total	47,600	1,163,000

Number of vessels entered harbor for refuge	328
Number of vessels hauled up for repairs	198
Tonnage of vessels hauled up for repairs	12,926
Number of vessels laid up for winter, 1892–'93	61
Tonnage of vessels laid up for winter, 1892–'93	3,125

HARBOR AT PULTNEYVILLE, N. Y.

Pultneyville is a small village of less than 1,000 inhabitants, on Salmon Creek, at its entrance to Lake Ontario, New York. It is about 23 miles northeast of Rochester, and has no rail or canal communication.

The project for the improvement of this harbor was adopted in 1870 (the date of the first appropriation), and proposed the construction of a timber breakwater running eastward from the west shore and then northward as a jetty into the lake, also an east jetty parallel to and about 200 feet from the west one, and a dredged channel between them.

The project was modified in 1875 to provide for increased dredging.

The object of the improvement was to provide a channel of navigable width and not less than 10 feet deep through the bar and into the mouth of Salmon Creek, which was the harbor. The natural channel was not more than 2 feet deep.

In 1884 it was proposed, in order to make the dredging of permanent value and effect, to build a sand-tight structure parallel to the breakwater and about 100 feet from it between it and the beach, so as to arrest the movement of the beach sand and keep it out of the channel.

The total amount expended to June 30, 1893, is $73,937.09, and has resulted in the extension of the jetties to the 10-foot curve in the lake, and in the construction of about 200 feet of sand-tight bulkhead, and in a large amount of dredging in the channel. The last work of this kind was done by the United States dredging plant belonging to this district during the month of May, 1893. Ten thousand seven hundred and six cubic yards of material was removed, forming a good channel from the lake between the piers and up the creek as far as the wharves and warehouses. This channel has a general depth of about 10 feet at low water in the lake.

The depth diminishes somewhat in the extreme inner portions of the harbor on account of the rock bottom. Since the construction of the sand-tight bulkhead there is reason to hope that this channel will be much more permanent than the former works.

The superstructure of the breakwater and of a greater part of the jetties is now very much decayed.

It is estimated that $9,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals at Pultneyville Harbor, New York, during fiscal year ending June 30, 1893.

Trade engaged in.	Steamers.		Sailing vessels.	
	No.	Registered tonnage.	No.	Registered tonnage.
Home on lake	2	48	4	177
Foreign on lake	.....	.....	4	240
Total	2	48	4	417
American owned	2	48	4	241
Canadian owned	.....	.....	4	176

Sum total, 10 arrivals; 465 registered tonnage.

HARBOR AT SACKETTS HARBOR, N. Y.

The project for the improvement of this harbor was adopted in 1881, and proposed the deepening of the harbor by dredging over an area of about 15 acres to a depth of 12 feet at low water. The depth previously existing was less than 8 feet over a large part of this area.

In 1826 and 1828 the sum of $6,000 was expended in clearing and deepening this harbor. The total amount expended from 1826 to June 30, 1893, is $14,406.01. The amount expended from the adoption of the present project to June 30, 1893, is $8,406.01, and has resulted in the removal of 24,010 cubic yards of sand, mud, and gravel from the harbor, and in the construction of a stake and fascine dike 164 feet in length, with a mooring crib 18 feet square at its extremity to shelter the basin and exclude gravel drift from it. With the completion of this work the harbor has a depth of 12 feet at low water over about 6 acres of its area, except in a small place where the presence of rock in place limited the depth to a little less than 12 feet.

It is estimated that $5,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

HARBOR AT RARITAN, N. J.

Rariton Bay forms the western part of the large triangular bay inclosed between Sandy Hook, the New Jersey shore, and Staten Island, the eastern part of which is commonly known as the Lower Bay, as it lies just outside of or below New York Harbor. The Raritan River flows into Raritan Bay at its extreme western end, passing between Perth Amboy and South Amboy.

The principal commerce of this bay is that passing to and from Perth Amboy and South Amboy, N. J., and amounts in freight tons to upward of 6,000,000 annually.

The original survey of this harbor was made in 1880, and the project based thereon provided for the dredging of a channel across Seguine Point Shoal, 300 feet wide and 21 feet deep, at an estimated cost of $126,500.

The project was enlarged in 1885, providing for a channel of equal width and depth over the shoals in the vicinity of Wards Point, Staten Island, where the original depth was 18 feet, mean low water, giving a navigable channel 21 feet deep, mean low water, up to Perth Amboy; and further providing for a channel 300 feet wide and 15 feet deep, mean low water, from Great Beds Light to South Amboy, where the original depth was 12½ feet, mean low water, at an estimated total cost of $240,500, for the two works from the beginning, which estimate was again increased in 1888 to $246,500, to provide for the removal of deposits which had taken place in the interval of three years.

The channel from deep water at the head of Raritan Bay, past Seguine Point to Perth Amboy, exceeds 5 miles in length, is crooked, and is subject to constant shoalings. As the amount appropriated any one year for the execution of the project has been much less than the estimated cost of the improvement, and as the channel excavated under each appropriation has been impaired by shoaling in a greater or less degree before work could be resumed under the succeeding appropriations, the original estimates for this improvement have little value and can not be used for determining the amount required for completing the project at this date. The cost of completing the project, if all

the required money could be made available at one time, was estimated in 1891 at $175,375.

The amount expended upon the modified project of 1885, up to the close of the fiscal year ending June 30, 1892, inclusive of outstanding liabilities, was $221,276.85. At the close of the contract, June 15, 1888, the channel was 300 feet wide and 21 feet deep, mean low water, from Perth Amboy to the bend at Great Beds Light, and 300 feet wide and 20 feet deep, mean low water, across the crest of the shoal in the channel leading from the bend toward Seguine Point. At the close of the year the channel eastward of Senguine Point was 180 feet wide, with a depth of 21 feet, mean low water, and the channel from Great Beds Light to South Amboy was 170 feet wide and 15 feet deep, mean low water.

The amount expended during the fiscal year ending June 30, 1893, inclusive of outstanding liabilities, was $235,201.54, and was applied in dredging 81,831 cubic yards of material from channel leading from Great Beds Light to South Amboy, and 88,250 cubic yards of material from Seguine Point Channel, thus giving the former an available depth of 15 feet, mean low water, and width of 300 feet, and the latter an available depth of 21 feet, mean low water, and width of 250 feet.

It is estimated that $95,375 will be required to complete the existing project and that $95,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Vessels arriving and departing, South Amboy, N. J., fiscal year 1890.

Class.	Number.	Tonnage.	Draft (loaded).
			Feet.
Steamers	6,038	350,300	6 to 12
Barks	40	8,800	8 16
Brigs	40	8,800	8 16
Schooners	4,138	248,280	7 14
Sloops	1,002	52,210	5 7
Propellers	4,028	280,682	7½ 19
Barges and lighters	45,838	2,887,794	7 16
Total	61,124	3,845,866	.....

Commercial statistics of the port of Perth Amboy, N. J., for the fiscal year ending June 30, 1891.

Amount of revenue collected	$16,584.13
Value of all imports	58,133.00
Value of all exports	1,207,089.00

	Number.	Registered tonnage.
Foreign vessels entered	14	12,759
Foreign vessels cleared	61	50,046
American vessels from foreign ports	8	3,232
Coastwise vessels entered	98	68,959
Coastwise vessels cleared	56	21,632

HARBOR AT KEYPORT, N. J.

Keyport Harbor is on Raritan Bay, 23 miles southwest of New York. Several manufacturing establishments are located in the adjacent city, and shipbuilding and the oyster business contribute materially to its prosperity.

The harbor was originally accessible at low water only to vessels drawing less than 4 feet. Before its improvement was undertaken by the United States a 6-foot channel had been dredged at private expense, which had shoaled in 1872 to 5½ feet and in 1882 to 5 feet, the range of the tide being 4.7 feet. A large commerce was carried on, however, valued at $2,932,000.

The project for the improvement was adopted in 1873 and provided for dredging a channel 4,700 feet long, 8 feet deep at mean low water, and 200 feet wide from the steamboat dock to the 8-foot contour in Raritan Bay, at an estimated cost of $30,475. The revised estimate of 1884 was $40,475.

The amount expended on this improvement to the close of the fiscal year ending June 30, 1892, is $30,475.

With the above amount a channel had been dredged from the 8-foot depth in Raritan Bay to Keyport Wharf, a distance of 5,000 feet, with a width of 200 feet for the first 4,200 feet and 160 feet for the remainder. As a result the commerce of the harbor increased greatly, being estimated at $5,000,000 for 1890–'91, besides 150,000 passengers carried annually.

A survey made in October, 1892, shows that this channel has not maintained itself, having contracted to widths of from 60 to 175 feet with mean low-water depths of from 6 to 8 feet.

There had been no appropriation for this work since 1882, until July 13, 1892, when $5,000 was made available by the river and harbor act of that date.

The expenditures during the fiscal year ending June 30, 1893, amount to $4,914.32, with which the channel in front of the steamboat dock was dredged to the required mean low-water depth of 8 feet, and widths of from 70 to 140 feet for a distance of 400 feet, thence for a distance of 2,200 feet outward, a cut 35 feet wide was dredged to a similar depth along the northerly side of the old channel.

The commerce is reported for the calendar year 1892 to be 358,391 tons, against 241,252 tons for 1891.

It is estimated that $5,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

HARBOR AT ERIE, PA.

The city of Erie, situated on this harbor, had, in 1890, a population of 86,000, with large commercial and manufacturing interests. Several lines of railroad center in the city, whose business is greatly increased by the lake shipping.

This harbor is unquestionably the best natural haven on Lake Erie. Once within it there is ample room for many vessels to lie and have plenty of water under them. Being wholly surrounded by either natural or artificial protections, its waters can never be disturbed by storms sufficiently to endanger vessels lying therein, whether at the dock or at anchor.

The original survey of this harbor was made in 1819, at which time the channel was narrow and tortuous, with a depth of only 6 feet. In 1823 a plan for the improvement was adopted, and constitutes the present work at the entrance to the harbor, excepting some changes which have been required, either on account of the age of the structures already built or other causes. The piers have been extended from time

to time, and are now in pretty good order and condition. The north pier needs considerable repairs.

The present project contemplated the extension of the piers to the 16-foot curve in the lake and the maintenance of a channel of navigable width 16 feet in depth from the harbor inside to the lake outside.

Operations have been prosecuted with more or less interruption and suspension (no work was done from 1838 to 1842, from 1846 to 1853, and from 1855 to 1864), and have resulted in much benefit to the harbor and its channel entrance. The work during the year consisted in the extension of the north pier for 300 feet, of which 5 cribs were sunk at the end of the year and the last since that date. The total amount expended up to June 30, 1892, was $798,892.33. The amount expended during the fiscal year ending June 30, 1893, was $4,609.47.

It is estimated that $25,000 can be profitably expended in improving this harbor during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for the year ending December 31, 1892.

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
Steam	867	1,081,360	13	1,163	885	1,085,420	15	3,145
Sail	181	115,570	18	2,178	185	119,453	16	1,656

Greatest draft of vessels, 16½ feet.
Increase of tonnage, 1892 over 1891, 66,379.
Amount of revenue collected, fiscal year ending June 30, 1892, $24,297.08.
Value of foreign imports, $20,132.
Value of foreign exports, $15,718.
Enrolled tonnage, port of Erie, 1892, 24,214.99.
Enrolled tonnage, port of Erie, 1893, 37,620.
Increase, 1893, 13,405.01.

BY LAKE.

[Tons of 2,000 pounds each.]

Year ending December 31—	Imports.	Exports.
1886	364,920	318,645
1887	416,976	324,470
1888	473,735	525,716
1889	804,800	499,003
1890	1,033,796	700,260
1891	917,757	756,452
1892	1,399,103	673,952

DELAWARE BREAKWATER, DELAWARE.

Under the act of Congress, May 7, 1822, $22,700 was appropriated for a survey of Delaware Bay, near Cape Henlopen, for the purpose of determining upon the site for a harbor of shelter. In 1828 an appropriation of $250,000 was made for commencing the work under a plan submitted by a board of commissioners appointed by Congress.

The project of the board contemplated the construction in the concavity of the bay, just inside Cape Henlopen, of two massive works on

the pierres perdues or riprap system, separated by an interval or gap of 1,350 feet, the greater, called the breakwater, to afford safe anchorage during the gales from the north and east; the other, called the ice-breaker, to protect shipping against northwesterly gales and the heavy drifting ice of the bay.

This project was completed in 1869 under aggregate appropriations, including the first for survey, of $2,192,103.70.

The breakwater is 2,558 feet long, and the ice-breaker 1,359 feet long on top. The average width on top is 22 feet and at base 160 feet. The top is from 12 to 14 feet above mean low water.

In 1882 a project was adopted for closing the gap between the breakwater and the ice-breaker by means of a random stone foundation with a concrete superstructure.

In 1891, the random stone substructure having been practically completed to an average level of 15 feet below low water, the project for the hitherto proposed concrete superstructure was modified by substitution of random stone for the remaining part of the work, so as to raise the structure to a height of 14 feet above mean low water, with a width on top of 20 feet, the width at low water to be 40 feet, and the slopes below this plane to be such as may be formed by the action of the sea; between low water and the top the slopes to be about 1 on 0.7, formed by heavy stones laid in position. The estimated cost of closing the gap is $756,250.

From the beginning of the work in 1822 to June 30, 1892, the total amount expended was $2,627,367.87; of which $435,264.17 was expended on the existing project for closing the gap, the substructure having been thereby raised to the level of mean low water over a length of 1,006 feet.

During the fiscal year ending June 30, 1893, the sum of $50,823.39 was expended in raising the substructure to low water over its full length. The gap is now completely closed to the level of mean low water.

It is proposed to apply any funds which may become available in the future to the construction of the superstructure, and the strengthening of the slopes if necessary.

The increase in the dimensions of vessels since the present harbor was designed, in 1822, and the shoaling which has ensued behind the breakwater, render the harbor in its present condition inadequate to the requirements of commerce. Upon the completion of the present project of closing the gap, additional anchorage area will be added to the harbor, and it is probable that the shoaling will cease and the anchorage be deepened.

Under favorable conditions the work can be completed in a single working season. Its immediate completion is urgently necessary, since the substructure in its present condition is a serious danger to navigation, being invisible at the higher stages of the tide. One vessel has been totally wrecked upon it, and several others have been severely injured. It has been found impossible to mark it in such a way as to insure the safety of coasting vessels. The appropriation of the whole amount necessary for the completion of the work is therefore recommended.

It is estimated that $270,000 will be required to complete the existing project.

HARBOR AT WILMINGTON, DEL.

Christiana River discharges into the Delaware River at a point about 30 miles below the city of Philadelphia. One and a half miles above its mouth is the confluence of the Brandywine Creek, and the city of Wilmington is located upon the area directly west of the junction of these streams. The harbor of Wilmington includes about 4 miles of the Christiana River above its junction with the Delaware, and 2 miles of Brandywine Creek above its confluence with the Christiana.

Previous to 1836, when the first appropriation for the improvement of Christiana River was made, the depth of water at the entrance was about 8½ feet. The minimum depth in the channel of the portion of the river below Third Street bridge was 8 feet. This depth was increased by dredging in that year to 10 feet. Under a project commenced in 1871 and completed in 1881, a 12-foot channel from 100 to 200 feet wide was made from the mouth to above the city of Wilmington.

The present project was adopted in 1881 and is for a 15-foot low-water channel from the mouth of the river to the Pulp Works, with a width of 150 feet from the mouth to the rolling-mill wharf; 100 feet to the Delaware and Western Railroad bridge; and 75 feet to the Pulp Works. The project included further, a channel 12 feet deep and 50 feet wide from the latter works to the Delaware Railroad bridge and construction of a jetty on the north side of the mouth of the river. Dredging operations and the construction of the jetty were begun in the following year. The original estimate was $175,551, which was increased in 1883 to $191,384 by changing the width of the proposed channel to 150 feet throughout. In 1884 the project was amended by raising the height of the jetty 4 feet; an extension of 322 feet to the jetty as then built was also proposed and approved, but has not yet been carried out.

Up to the close of the fiscal year ending June 30, 1892, the sum of $201,404.66 had been expended under this project. There was then an improved channel 15 feet deep at low water and 150 feet wide between the mouth and the ship railway at the Pusey & Jones shipyard.

During the past fiscal year operations were carried on under the appropriation made July 13, 1892, and the channel, as approved, was extended from the Pusey & Jones shipyard to within 75 feet of Market Street bridge, and one of the ledges of rock near Third Street bridge was removed to the required depth. Under a supplementary contract the bar at the mouth of the river was also dredged, having shoaled considerably during the past four years. The total number of cubic yards of material removed under the dredging contracts was 72,986; and under the contract for removal of rock, 467.

With exception of a ledge of rock just below Third Street bridge, over which there is 12 feet of water, and for the removal of which to 15 feet a contract has been made, the channel in the river is now completed in accordance with the project from the Delaware River to Market Street bridge.

It is estimated that $47,634 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Number of vessels cleared and entered from July 1, 1892, to March 31, 1893, is 185; gross tonnage, 17,748.47.

Vessels built and repaired at Wilmington, Del., during the year ending June 30, 1893: Built, 25, of aggregate tonnage 16,372; value, $1,965,000. Repaired, 185; value, $185,000.

HARBOR AT BALTIMORE, MD.

The depth of the channel of this harbor has by successive steps been increased from 17 feet at mean low water to 27 feet, with an average rise of tide of about 18 inches.

The project of improvement first adopted and commenced in October, 1853, had for its object to give a channel 22 feet deep at mean low water, with a width of 150 feet.

Little was done before the late war, but afterwards these dimensions were increased, a depth of 24 feet at mean low water being determined upon, with a width of channel ranging from 250 to 400 feet.

This channel was completed in 1874, important changes of position having been given to a portion of it by which the distance was materially lessened and the expense of maintenance decreased.

The object of the improvement was to permit the approach to Baltimore, at mean low water, of vessels drawing from 22½ to 23 feet, and at ordinary high water of vessels drawing 24 and 24½ feet. Later the project had in view a depth of 27 feet at mean low water, with a width of 600 feet, to allow the entrance and departure of the largest vessels.

Up to June 30, 1892, the United States had expended $2,932,517.01. The city of Baltimore and the State of Maryland, chiefly the former, have also contributed to the same object more than $500,000. The expenditure up to June 30, 1893, by the United States was $3,186,215.10. The river and harbor act of September 19, 1890, contained the following proviso:

Provided, That such contracts as may be desirable may be entered into by the Secretary of War for the completion of the existing project, or any part of same, to be paid for as appropriations may from time to time be made by law.

As soon as possible thereafter a contract was entered into for the completion of the improvement. The work was very vigorously prosecuted and satisfactorily finished in December, 1892.

The channel is now 600 feet wide, with a depth of 27 feet at mean low water, the width being much greater at the turns.

This channel will require repairs from time to time, like all artificial highways. The latest experience and a restudy of the conditions of the case confirm the opinion and estimate made some years ago, that the maintenance of the channel after completion will require the annual expenditure of $50,000. This is, however, a small sum when contrasted with the great gain to Baltimore and her dependent interests, as well as in revenue to the U. S. Treasury, by the increase of the depth from 17 to 27 feet at low water, which means the introduction of many lines of deep ocean steamers to European and other foreign and domestic ports within the past twenty years, whereas there were none before of any importance. The expense of repairs is increased if they are not regularly and systematically made. The channel to Baltimore was finished in 1892 to a depth of 27 feet at mean low water. This depth can not be maintained except with occasional work in the nature of repairs. No appropriation was made for such work in the year ending June 30, 1894, and no dredging can therefore be done. The appropriation now asked for is consequently for two years. The present small balance is held for an extraordinary contingency and necessary surveys after the completion of the work. These surveys are now in progress.

It is estimated that $100,000 can be profitably expended improving this harbor during the ensuing fiscal year.

COMMERCIAL STATISTICS FOR 1893.

Tonnage movement.

	Foreign.		Coastwise.	
	1892.	1893.	1892.	1893.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Inward	1,123,368	774,399	1,192,137	1,272,868
Outward	1,383,935	1,112,456	1,524,602	1,447,453

Value of imports.

1893 (free)	$7,419,132
1892 (free)	6,652,028
Increase in 1893	767,104
1893 (dutiable)	8,730,980
1892 (dutiable)	6,766,225
Increase in 1893	1,964,755

Recapitulation of imports.

1893 (free)	7,419,132
1893 (dutiable)	8,730,980
Total value, 1893	16,150,112
Total value, 1892	13,418,253
Increase in 1893	2,731,859
Imports in American vessels, 1893:	
Sailing	3,177,147
Steam	45,175
Imports in foreign vessels, 1893:	
Sailing	502,703
Steam	12,397,400
Imports in cars overland, 1893	27,687
Total imports, 1893	16,150,112

Value of domestic exports.

1893	71,482,652
1892	98,796,856
Decrease in 1893	27,314,204
Exports in American vessels, 1893:	
Sailing	1,050,843
Steam	

Value of domestic exports—Continued.

Exports in foreign vessels, 1893:	
Sailing	$109,610
Steam	70,322,199
Total exports in 1893	71,482,652

Recapitulation of exports.

In American vessels, 1893	1,050,843
In foreign vessels, 1893	70,431,809
Total, 1893	71,482,652
Number of immigrants and passengers arrived:	
In 1893	26,183
In 1892	57,323
Decrease in 1893	31,140
Amount of dues collected in 1893	4,555,993.67
Miscellaneous customs receipts	73,205.46
Total receipts in 1893	4,629,199.13
Total receipts in 1892	3,178,558.44
Increase in 1893	1,450,640.69
Duties on merchandise in bond:	
1893	501,297.92
1892	219,752.15
Increase, 1893	281,544.77

Summary of duties, 1893.

Duties, etc., collected	4,629,199.13
Duties on merchandise in bond	501,297.92
Duties on merchandise in bond, with and without appraisement	2,937,274.98
Total	8,067,772.03

Vessels built.

Year.	Number.	Gross tons.	Net tons.
1893	33	4,716.35	3,338.60
1892	30	3,013.46	1,986.33
Increase, 1893	3	1,702.89	1,402.27

STATISTICAL RECAPITULATION.

Dutiable merchandise increased	$1,964,755
Free merchandise has increased	$767,104
Domestic exports have decreased	$27,314,204
Increase in duties collected	$1,450,640.69
Increase in duties on merchandise in bond	$501,297.92
Increase in duties on merchandise in bond, with and without appraisement	$1,138,022.49
Increase in number of vessels built	3

HARBOR AT NORFOLK AND ITS APPROACHES, VIRGINIA.

The Elizabeth River and its branches constitute Norfolk Harbor, on which are situated the cities of Norfolk, Portsmouth, and Berkley, possessing a total population of upwards of 52,000.

The shipments of cotton, coal, and truck-farming products from this harbor by water are enormous. The harbor is visited daily by immense steamers plying between this port and New York, Boston, Savannah, Baltimore, and other important ports, besides a large number of smaller packet steamers navigating the waters of Virginia and eastern North Carolina. During the cotton-shipping season there can be found continuously in the docks of the several cotton compresses heavy draft "tramp" steamers being laden for Liverpool, Bremen, and other European ports.

In 1877, previous to the commencement of the present improvement, the impediments to navigation were shoals at mouths of the Eastern, Southern, and Western branches, and at Sewalls Point. The depths on these shoals and the widths of the channels, particularly in the inner harbor where encroached upon by the Portsmouth and Berkley flats, were insufficient for the requirements of the port.

The revised project of 1885 is as follows: (1) To dredge a channel, not less than 500 feet wide and 25 feet deep at ordinary low water, from the deep water in Hampton Roads to Norfolk and the United States navy-yard, on the Southern Branch, and also to dredge a channel in the Eastern Branch not less than 22 feet deep at ordinary low water, with a width of 700 feet at its mouth, and of not less than 300 feet at the Norfolk and Western Railroad Bridge; (2) to ultimately dredge the entire area bounded by lines parallel to and 75 feet from the port-warden lines to a depth not less than 25 feet from Fort Norfolk to the United States navy-yard, and not less than 22 feet from the mouth of the Eastern Branch to Campostella Bridge, and to build a bulkhead at Berkley Flats.

To the project of 1885 there was added, in 1890, the dredging of an anchorage at the mouth of the Western Branch, with a depth of not less than 25 feet at ordinary low water, at an estimated cost of $150,000, which amount was added to the original estimate.

With slight modifications all operations have been conducted in accordance with the adopted projects.

The amount expended on this improvement to June 30, 1892, was $629,242.99, from which resulted a channel, not less than 500 feet wide and 25 feet deep at ordinary low water, from Hampton Roads to Norfolk Harbor, a channel of the same depth and from 125 feet to 500 feet wide in the Southern Branch to the United States navy-yard, and a channel not less than 22 feet deep at ordinary low water and from 300 feet to 500 feet wide in the Eastern Branch to the Norfolk and Western Railroad Bridge.

The channels thus dredged were in good condition, with the exception of the bar at the mouth of the Southern Branch, which by 1889 had shoaled to 22 feet and had not been redredged.

One hundred and fifty thousand dollars was appropriated for this improvement in 1890. Under contract, during the fiscal year, 917,170 cubic yards of material was removed and redeposited on Willoughby Bank to the eastward of the Ripraps in Hampton Roads. Of this amount 142,282 cubic yards was removed from Berkley Flats, at and above the mouth of the Eastern Branch; 93,088 cubic yards was removed from Portsmouth Flats and the bar, at the mouth of the

Southern Branch; 170,572 cubic yards was removed from the flat opposite Atlantic City, and 383,019 cubic yards was removed from the anchorage at the mouth of the Western Branch.

The result of this work has been the deepening and widening of the channels. Navigation has been greatly facilitated. As a result of the operations at the mouth of the Western Branch during the past two years 56 acres of the proposed anchorage has been dredged and 17 acres requiring no dredging has been made available. A number of old wrecks that were uncovered by the dredging at this point have not yet been removed.

It is estimated that $307,744.56 will be required to complete the existing project, and that $200,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Articles.	Quantity.	Value.	Articles.	Quantity.	Value.
IMPORTS.			EXPORTS—continued.		
Kainit		$16,492	Rye ....bushels..	149,919	$110,075
Salt		3,408	Bark		12,749
Dead oil of tar		3,299	Cattle ....head..	1,380	102,280
Wine		825	Tobacco ....pounds..	4,645,279	327,585
Coal		761	Corn ....bushels..	598,552	318,860
Miscellaneous		13,196	Wheat....do..	135,146	624,281
Total		37,981	Flour ....barrels..	74,418	443,195
EXPORTS.			Rosin		9,051
			Oats		59,200
			Cotton-seed oil ..gallons..	1,397,643	177,400
			Cotton-seed meal ..bush..	9,434,840	83,926
Cotton ....bales..	125,136	4,885,554	Miscellaneous		5,492
Coal....tons..	148,451	555,742			
Staves		305,085	Total		8,382,412
Lumber, logs, etc		391,931			

Navigation.

Direction.	Vessels cleared.		Vessels entered.	
	No.	*Tons.*	*No.*	*Tons.*
Foreign	528	696,217	56	65,295
Coastwise	1,391	1,373,048	1,594	1,419,176
Total	1,919	2,069,265	1,650	1,484,471

Approximate amount of freight of all kinds received and shipped by water.

	Tons.
1888	1,914,507
1889	2,243,087
1890	2,384,841
1891	2,931,751
1892	3,427,189

HARBOR AT WINYAW BAY, S. C.

Winyaw Bay is the natural and only ocean entrance to Georgetown Harbor and to Sampit, Black, Great Pedee, and Waccamaw rivers and their tributaries, with their 500 miles of navigable river, 18,000 square miles of drainage area, and their large combined annual commerce.

When the United States began to improve it, in 1890, there was at mean low water in the main (southerly) channel on its ocean bar 7 to 9 feet, and in the Bottle (easterly) Channel 6 to 8 feet, of water, both channels being changeable; thence 12 miles to the head of the bay vessels could draw 12 feet at lowest tides.

The project of 1885, continued to date, is to increase the depth of water in Bottle Channel to about 15 feet at mean low water by building, to the height of 6 feet above that plane, a jetty from North Island

10,700 feet long and a jetty from South Island 17,500 feet long across the main channel to the 15-foot curve, at a total estimated cost of $2,500,000.

To prevent the overflow to the depth of about 1 foot at mean high water of a wide expanse of marsh on the southerly side of the entrance to the bay, ensuing from the degradation of about 3 miles of beach, and hurtful changes to the tidal regimen of the bay, a dike 10,900 feet in length is to be built, at an estimated cost of $31,000, by authority from the Chief of Engineers of May 10, 1892.

To June 30, 1892, $186,975.79 has been expended upon this work.

At that date the north jetty had been built to a distance of 2,090 feet from the shore and height of 18 inches above mean low water.

With the amount applied during the fiscal year ending June 30, 1893, the north jetty has been extended with a height of 18 inches above mean low water 130 feet, and to a less height, gradually diminishing down to the thickness of the mattress ballast, 1,337 feet farther, to a distance of 3,557 feet from the shore. There has been no increase in depth on the bar since the jetty was commenced.

The present commerce of this bay is that of the Waccamaw, Pedee, Black, and Sampit rivers, and Georgetown Harbor, a commerce carried by many ocean vessels and two steamers making weekly trips to New York and Charleston. At the ocean bar there is at present only 7 feet depth at ordinary low water; otherwise navigation is practicable for boats of 12 feet draft. At present, however, vessels drawing no more than 10 to 12 feet are frequently detained for several days and sometimes weeks, awaiting a flush high water to take them over the bar; and however great the distress in which a vessel may be while approaching the harbor, no tug drawing over 6 to 7 feet can go to her assistance during the low water.

Winyaw Bay is the outlet to about $8,500,000 of annual commerce of the Sampit, Black, Pedee, and Waccamaw rivers. It is also connected by a 7-mile canal with the Santee River, thus rendering it the shortest and most accessible outlet to $5,000,000 of annual commerce coming down the Congoree, Wateree, and Santee rivers. This route has been rendered accessible, only recently, by furnishing with draw spans the railroad bridges across these streams which work has been completed during the past few months.

It is estimated that $2,181,250 will be required to complete the existing project, and $600,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The commerce for the year ending December 31, 1892, is estimated as follows:

Class of goods.	Tons.	Class of goods.	Tons.
Cotton	2,500	Fish and shell fish	4,156
Rice	10,606	Lumber and its products	66,349
Vegetables, including truck	120	General merchandise	125,000
Live stock, including poultry	5		
Turpentine, crude and spirits of, and resin	63,250	Total	271,986

Ten thousand five hundred passengers were carried during the year.

Freight transported.

Calendar year ending December 31—	Tons.
1885	125,000
1889	196,754
1890	261,029
1891	261,370

HARBOR AT SAVANNAH, GA.

In 1873, prior to improvement, the channel was in places not more than 9 feet deep at mean low water, and the usual high-water draft of vessels was not more than 14.5 feet.

The project contemplates the establishment of a navigable channel 26 feet deep at mean high water between the city of Savannah and Tybee Roads. The mean rise and fall of tides varies from about 7 feet at Fort Pulaski to about 6 feet in front of the city wharves.

The principal features of the project are:

(1) The enlargement of Drakie Cut.

(2) The entire or partial removal of King Island.

(3) The construction of a deflecting jetty from Argyle Island.

(4) The partial removal of Marsh Island and the closing of the channel north of it.

(5) The construction of a training wall from Marsh Island to Kinsey Point and the enlargement of the river near there.

(6) The construction of a training wall at Garden Bank.

(7) Spur jetties or bank protection in the Wrecks Channel, and a deflecting jetty at Mackay Point.

(8) The removal of a portion of Dam No. 15.

(9) The closing of Duck Puddle.

(10) The construction of shore protection and of training walls between the wing dams in North Channel from the Upper Flats to the Oyster Bed.

(11) The construction of training walls extending eastward from Cockspur Island and the Oyster Bed.

(12) Dredging is provided for between the Cross Tides and the Tybee Roads.

The estimated cost of this improvement is $3,500,000, provided funds are regularly and adequately supplied.

The total amount expended under the present project to June 30, 1893, including all outstanding liabilities, is $827,669.48.

There is now a navigable channel from the city to the sea with a mean low-water depth of 15.5 feet, a gain of about 6.5 feet since the work was begun.

The real gain in navigable depth is somewhat greater than here shown, and vessels of from 21 to 22 feet draft now go from the city to the sea on a single tide.

The estimated reduction in freight rates, due to the improvements already executed, is 25 per cent, which effects an annual saving in freights alone of more than the total sum of money expended by the United States upon the harbor within the last twenty-five years.

Cotton receipts at Savannah from 1872 to 1892.

Season, Aug. 31 to Sept. 1—	No. of bales.	Season, Aug. 31 to Sept. 1—	No. of bales.
1872–'73	612,794	1882–'83	817,670
1873–'74	630,372	1883–'84	655,749
1874–'75	614,478	1884–'85	728,087
1875–'76	523,244	1885–'86	803,359
1876–'77	477,435	1886–'87	804,412
1877–'78	597,449	1887–'88	892,318
1878–'79	693,764	1888–'89	828,168
1879–'80	741,018	1889–'90	956,517
1880–'81	889,383	1890–'91	1,139,569
1881–'82	737,056	1891–'92	1,027,816

Steamship lines.

Lines.	Savannah to—	Steamers.	Voyages.	Freight.
Ocean Steamship Co	New York	7	207	423,668
New England and Savannah Steamship Co*	Boston	2	69	101,925
Merchants' and Miners' Transportation Co	Baltimore	2	98	82,237
Ocean Steamship Co	Philadelphia	1	37	55,326
Total		12	411	663,156

*Controlled by Ocean Steamship Company.

COMMERCE.

Years.	Value of exports.	Value of imports.	Duties collected.	Years.	Value of exports.	Value of imports.	Duties collected.
1877	$32,103,853	$36,307,908	$34,959.93	1885	$48,313,216	$49,881,080	$45,161.40
1878	40,028,988	42,948,465	23,364.35	1886	51,033,190	51,118,524	35,455.53
1879	40,901,421	43,064,472	27,778.73	1887	54,774,082	52,659,223	48,837.12
1880	47,836,411	45,522,480	78,458.41	1888	56,435,601	53,412,920	98,213.75
1881	58,985,901	48,716,900	356,550.22	1889	62,892,429	55,062,710	58,815.54
1882	52,004,248	45,952,105	61,148.70	1890	84,584,326	68,229,825	57,542.57
1883	53,915,934	47,699,796	65,245.34	1891	83,367,157	67,248,000	56,714.50
1884	46,425,513	49,112,316	49,147.28	1892	67,211,175	54,119,194	47,687.00

It is estimated that $1,831,250 will be required to complete the existing project and that $1,500,000 can be profitably expended during the ensuing fiscal year.

HARBOR AT BRUNSWICK, GA.

About 2 miles above the city of Brunswick Turtle River is divided by Buzzards Island into two branches, the smaller one, flowing to the eastward of the island and upon which the city of Brunswick is situated, being known as East River, the other retaining the name of Turtle River. These streams unite again about 1½ miles below the city, to form Brunswick River. The lower part of East River forms what is known as the harbor of Brunswick.

The plan of improvement under which operations have been carried on in Brunswick Harbor during the last fiscal year was adopted in 1880, and modified and enlarged in 1886.

The project contemplates the establishment of a navigable channel not less than 15 feet deep at mean low water. The mean rise and fall of tide is 6.8 feet.

The cost of the project of 1880 was estimated at $73,187.50, and as enlarged in 1886 at $190,000, inclusive of appropriations already made.

In 1880, prior to improvement, the channel was not more than 9 feet deep at mean low water.

During the fiscal year just closed there was removed from the channel by dredging 29,933.1 cubic yards of material, and there were put into the training wall 3,866.15 cubic yards of brush fascines and 412.06 cubic yards of riprap stone.

The amount expended to June 30, 1893, including all outstanding liabilities, is $180,918.92, and has resulted in securing a navigable low-water channel not less than 15 feet deep.

Persons interested in the trade of Brunswick estimate that owing to past work of improvement in the harbor, freight rates have been reduced from 18 to 20 per cent, and that if the improvements were completed

according to the existing project, the total volume of trade would be increased 200 per cent.

It is estimated that $15,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and clearances of vessels and commerce at Brunswick, Ga., from January 1, 1878, to December 31, 1892.

ARRIVED.

Year.	Coastwise.			Foreign ports.						Total.		
				American vessels.			Foreign vessels.					
	No.	Tons.	Crew.	No.	Tons.	Crew.	No.	Tons.	Crew.	No.	Tons.	Crew.
1878.....	116	32,584	850	36	19,218	270	41	19,008	493	193	61,810	1,613
1879.....	148	44,397	1,000	33	8,235	232	40	17,589	468	221	70,221	1,790
1880.....	271	77,656	1,891	36	11,219	317	39	14,996	432	346	103,871	2,641
1881.....	279	100,451	2,239	13	4,174	98	63	30,279	751	355	134,904	3 088
1882.....	335	123,149	2,659	7	2,095	57	63	26,958	694	405	152,202	3,416
1883.....	299	110,302	2,368	11	4,814	107	87	40,765	979	397	155,881	3,454
1884.....	239	88,063	1,893	10	4,434	88	126	62,818	1,435	375	155,315	3,416
1885.....	242	93,280	1,928	10	3,216	76	94	43,284	1,037	346	139,780	3,052
1886.....	229	88,244	1,751	7	3,262	48	98	47,798	1,164	334	139,304	2,835
1887.....	194	86,731	1,625	8	2,251	116	102	54,537	1,232	304	144,519	2,973
1888.....	821	290,590	3,619	9	2,991	76	147	80,330	1,729	977	373,911	10,424
1889.....	220	92,831	1,764	29	10,035	176	191	113,757	2,403	431	216,623	4,343
1890.....	316	196,701	3,844	23	7,513	186	126	71,158	1,559	465	275,372	5,589
1891.....	374	235,565	5,462	29	8,025	164	107	70,228	1,523	501	313,818	6,149
1892.....	439	279,998	4,450	42	20,548	354	134	85,332	1,812	615	385,878	6,616

CLEARED.

1878.....	124	32,767	874	28	9,231	236	49	21,218	550	201	63,216	1,660
1879.....	157	42,345	1,116	21	7,172	172	47	21,730	555	225	71,247	1,843
1880.....	270	78,913	2,010	14	5,010	115	48	19,970	550	332	103,900	2,675
1881.....	252	82,155	1,732	17	7,218	156	87	42,659	1,014	356	132,932	1,902
1882.....	278	96,170	2,086	19	7,761	170	101	48,699	1,139	398	152,630	3,395
1883.....	257	91,036	1,962	28	11,268	240	124	55,717	1,369	411	158,021	3,571
1884.....	176	62,927	1,322	38	16,209	335	148	70,612	1,633	362	149,478	3,290
1885.....	196	71,345	1,481	21	8,696	190	135	62,437	1,456	352	142,478	3,127
1886.....	184	67,020	1,413	17	7,528	159	117	56,280	1,305	318	130,828	2,877
1887.....	130	51,305	958	5	5,858	143	131	72,894	1,526	276	130,057	2,627
1888.....	785	266,152	8,240	13	4,715	116	173	102,300	2,236	971	373,227	10,592
1889.....	169	65,809	1,273	11	4,266	103	221	130,919	2,830	401	200,994	4,206
1890.....	247	122,820	2,024	18	8,745	165	172	107,197	2,261	437	238,762	4,450
1891.....	313	186,171	3,432	26	16,045	234	141	94,827	1,980	480	297,043	5,646
1892.....	390	247,329	4,228	19	6,882	174	163	109,728	2,334	572	363,939	6,736

COMMERCE.

Year.	Value of exports.	Value of imports.	Total collection.	Year.	Value of exports.	Value of imports.	Total collection.
1878.....	$1,372,842	$400	$4,500.97	1886.....	2,828,656	2,397	5,834.43
1879.....	1,394,401	3,197	5,644.33	1887.....	4,121,660	*2,815,769	37,520.00
1880.....	1,702,570	8,098	17,723.27	1888.....	7,552,025	*3,140,231	7,438.04
1881.....	2,230,000	4,377	29,305.30	1889.....	7,894,281	6,557	8,933.66
1882.....	1,700,000	2,734	20,058.90	1890.....	7,355,841	7,326	5,748.00
1883.....	3,437,000	3,093	24,911.61	1891.....	*9,742,553	*3,014,207	5,982.07
1884.....	3,500,000	958	19,780.32	1892.....	5,372,775	22,988	6,408.15
1885.....	3,063,960	4,008	3,939.27				

*Coastwise and foreign.

Comparative statement of receipts and shipments of naval stores.

Year.	Receipts (barrels).						Shipments (barrels).							
	Stock on hand.		Receipts for year.		Total.		Coastwise and interior towns.		Foreign.		Stock on hand.		Total.	
	Rosin.	Spirits.	Rosin.	Spirits.	Rosin.	Spirits.	Rosin.	Spirits.	Rosin.	Spirits.	Rosin.	Spirits.	Rosin.	Spirits.
1880....	3,000	600	36,495	8,661	39,495	9,261	29,339	8,371	7,201	650	2,935	240	39,475	9,261
1881....	2,935	240	67,562	13,490	70,297	13,730	37,029	8,621	18,077	3,009	15,191	2,100	70,297	13,730
1882....	15,191	2,100	104,357	23,459	119,548	25,559	46,785	11,533	52,972	11,826	19,791	2,200	119,548	25,598
1883....	19,791	2,200	80,078	16,105	99,769	18,305	9,846	5,183	74,687	12,229	15,236	1,893	99,769	18,305
1884....	15,236	893	105,622	23,449	120,858	24,342	22,859	2,565	98,983	20,167	8,016	2,610	120,858	24,342
1885....	8,016	1,610	92,958	30,900	100,974	22,510	20,197	3,556	68,814	26,169	11,963	2,785	100,974	22,510
1886....	11,963	2,786	139,366	34,625	151,329	37,410	30,898	15,620	75,094	10,629	45,337	1,161	151,129	37,410
1887....	45,337	1,161	125,546	32,338	170,883	33,459	22,356	7,959	111,731	23,986	36,813	1,403	170,890	33,439
1888....	27,098	2,420	140,820	37,643	167,918	40,063	29,746	8,339	120,159	27,901	18,013	3,823	167,918	40,063
1889....	.....	.....	186,000	45,000	.....	.....	17,753	6,889	152,394	29,560	31,869	2,259	202,016	38,708
1890....	31,869	2,259	212,374	42,813	244,243	45,072	37,553	11,772	145,406	32,212	29,421	1,088	212,374	45,072
1891....	29,421	1,088	161,402	42,697	190,823	43,875	25,391	5,640	127,755	36,800	30,294	651	183,440	43,091
1892....	30,294	651	220,250	52,446	250,544	53,147	42,575	9,763	163,604	39,181	20,847	4,005	227,026	53,947

CUMBERLAND SOUND, GEORGIA.

The entrance to Cumberland Sound is situated between Cumberland Island, Georgia, and Amelia Island, Florida.

The available depth at the entrance in its unimproved condition varied from 11 to 12.5 feet at mean low water. The mean rise and fall of tide is 5.9 feet.

The plan of improvement, as adopted in 1879 and revised in 1891, provides for the construction of two low jetties, composed of riprap stone, with a mattress hearting whenever admissible, resting upon a foundation mattress of brush or logs and brush, starting, respectively, from the shores on opposite sides of the entrance and extending seaward across the bar upon lines so directed that the ends will be parallel to each other and about 3,900 feet apart. These jetties are intended to establish a low-water channel across the bar not less than 19 feet in depth. The cost of the improvement was originally estimated at $2,071,023, and, as modified, at $1,606,500, for the completion of the low jetties, and at $2,079,500 if high jetties are found necessary.

Nothing was ever expended in improving the entrance to Cumberland Sound previous to the adoption of the existing project. Since then appropriations have been made by Congress for the work, aggregating $762,500.

During the fiscal year just closed there were placed in the north jetty 107,734.92 square yards of brush mattresses and 13,683.63 cubic yards of riprap stone, extending from the foundation course 3,698.6 feet, the second course 6,896.4 feet, and the third course 94.9 feet. The total amount expended to June 30, 1893, including all outstanding liabilities, is $761,914.92.

Examinations of the work and of the bar channel were made in March and in June, 1893. The jetties have received no injury during the year and are in good condition. From the shore end to a point about 3,800 feet from it the crest of the south jetty is on the average up to mean low water. Beyond this point the depth on the crest raises from about 10 to about 16 feet at mean low water. On the shore end of the north jetty the depth on the crest varies between 3 and 6 feet. Between the first and the second angle point it varies between 1 and 5 feet. From the second angle point to about 3,000 feet beyond it averages about $3\frac{1}{2}$ feet, and thence to the end of the jetty it varies between 6 and 10 feet.

The channel remains in about the same position as last year. It crosses the south jetty and then extends seaward in an almost due easterly direction, the available depth over the bar being about 13 feet.

It is estimated that $1,817,500 will be required to complete the existing project, and that $1,000,000 can be profitably expended during the ensuing fiscal year.

Commerce of Fernandina, Fla.

Year.	Value of exports.		Value of imports.		Total commerce.	Duties collected.
	Foreign.	Coastwise.	Foreign.	Coastwise.		
1875	$209,791	$1,119,979	$14,304	$755,718	$2,089,792	$1,817.84
1876	226,076	1,170,240	46,179	1,131,032	2,573,827	2,181.40
1877	310,225	676,855	19,304	1,146,363	2,152,747	2,376.00
1878	248,000	780,607	8,142	172,234	1,901,983	2,090.00
1879	275,470	921,368	11,038	1,360,432	2,568,308	3,424.00
1880	257,780	667,092	3,676	1,365,857	2,294,405	7,808.00
1881	242,100	1,064,394	11,791	1,786,546	3,104,831	8,183.00
1882	292,400	1,342,421	45,792	7,536,588	3,217,201	36,590.00
1883	248,600	2,573,010	11,229	2,262,755	5,095,594	5,566.00
1884	173,600	1,164,462	1,874	1,738,620	3,078,556	1,331.00
1885	214,726	2,134,541	4,180	1,502,544	3,855,991	1,451.28
1886	191,595	2,843,000	590	1,625,000	4,660,185	808.00
1887	226,960	3,500,000	23,896	2,000,000	5,750,856	3,400.00
1888	175,150	2,500,000	.....	650,000	3,325,150	4,655.06
1889	325,980	3,970,180	601	3,150,000	7,446,761	4,712.40
1890	478,475	2,245,753	10,902	4,997,683	7,732,813	7,335.32
1891	778,251	1,708,276	.....	2,938,000	6,424,527	None.
1892	1,389,043	1,125,543	701	6,500,000	9,015,287	3,604.22

All the commerce of St. Marys, Ga., and 90 per cent of the commerce of Fernandina, Fla., are dependent upon water transportation through Cumberland Sound.

The Florida Central and Peninsular Railroad, terminating at Fernandina, besides traversing a fertile and well-timbered country, pierces also the Florida phosphate fields, and much of the rock from the phosphate mines is brought by this road to Fernandina for shipment to coastwise and foreign ports. For the handing of this increased traffic the railroad has built new wharves, erected a large elevator, and extended its terminal facilities. From information derived from the owners of the principal mines it is estimated that the annual shipments of rock will aggregate about 300,000 tons.

The Mallory line has two steamships per week plying between Fernandina and New York, which carry annually about 61,000 tons of freight. Fifteen steamers per week ply between Fernandina and local coastwise ports, and a large fleet of foreign and coastwise vessels is engaged in the commerce of this port.

In 1892 the shipments, foreign and coastwise, amounted to 266,630 tons, valued at $2,482,393, and the receipts by water were 25,580 tons, valued at $6,500,000.

HARBOR AT DARIEN, GA.

About 12 miles above the town of Darien the Altamaha River divides into several branches. The northerly main branch forms the Darien River. That portion of Darien River between Darien and Doboy Sound is known as Darien Harbor. It covers a total distance of 10 miles, more or less obstructed by shoals with minimum low-water depths on them of from 6.3 to 10.6 feet. The reaches between these shoals have nowhere less than 12 feet depth at mean low water.

The plan of improvement adopted in 1885 contemplates the establishment of a navigable channel between Darien and Doboy, with a minimum low-water depth of 12 feet. This is to be accomplished by dredging to a minimum depth of 12.5 feet, and by the construction of wing dams at five of the shoals for maintaining the depth of the improved channel.

During the fiscal year just closed there were constructed 20 spur dams for the improvement of the upper river, in the construction of which there have been used 15,068.35 cubic yards of brush fascines, 59,290.25 feet, B. M., of 6 by 10 inch timber, and 6,094.46 pounds of iron bolts. There were driven 1,075 piles, 4 groups of tie piles, and 39 clusters of fender piles, making a total of 1,200 piles.

The total expenditures under the present project of improvement to June 30, 1893, including all outstanding liabilities, amounted to $49,546.68.

It is estimated that $120,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCE AND NAVIGATION.

The commerce of Darien is entirely dependent upon water carriage. It consists principally of shipments of lumber, timber, naval stores, and rice, which are brought down the Altamaha from the region bordering that river and its tributaries. But little cotton seeks an outlet at this port. The total annual trade amounts to about 125,000 tons, valued at $1,500,000, the freight on which is about $600,000.

The outlet of Darien Harbor is by way of Doboy and Doboy Bar, but the shoaling of the latter renders the entrance of deep-draft vessels impossible, and much of the timber that would otherwise be shipped from Darien is now rafted to Sapelo and St. Simons, at an increased cost of about 25 cents per 1,000 feet. These shipments, amounting annually to about 20,000,000 feet, are not included in the Darien exports, although it all passes through the harbor.

There is also a large number of small sailing craft carrying rice, fish, vegetables, etc., plying on the inland waters around Darien, and on the inland route there are two steamers per week to Savannah, one per week up the Altamaha River, and the Empire Mills Company has a steamer running regularly to Brooklyn, N. Y., carrying lumber, returning with cargoes of general merchandise.

HARBOR AT APALACHICOLA BAY AND RIVER, FLORIDA.

Originally a bar existed at the mouth of the Apalachicola River, extending from one-half mile below the town of Apalachicola, Fla., to the lower anchorage. The minimum channel depth over this bar was $3\frac{1}{2}$ feet.

The bar begins about one-half mile below the town of Apalachicola, Fla., and is about 7,300 feet wide between the 8-foot curves.

In 1879 a plan of improvement was adopted which contemplated dredging through the bar a straight channel 11 feet deep and 100 feet wide, to be afterwards increased to 200 feet should the first cut produce results to warrant it. In 1891 the project was amended to include dredging a straight channel through Bulkhead Shoal 9 feet deep and not less than 100 feet wide.

Up to June 30, 1892, the sum of $106,951.32 had been expended on

this improvement in dredging a straight channel through the bar at the mouth of the Apalachicola River at various times since 1881, and in dredging a channel about 4,000 feet long, 120 feet wide, and 9 feet in depth across Bulkhead Shoal in 1891–'92. With the appropriations available the dredged cut through the bar had never exceeded 90 feet in width and 9½ feet in depth, and had gradually filled up after each dredging, partly by the deposit of silt from the river and partly by the washing in of material from the sides of the cut.

During the fiscal year ending June 30, 1893, $19,877.29 has been expended. Under contract 55,126 cubic yards of material was dredged from the channel through the bar at the mouth of the Apalachicola River between November, 1892, and April, 1893, at 33 cents per cubic yard. The dredged cut was about 5,600 feet long, from 70 to 120 feet in width, and 8 feet in depth.

It is anticipated that the cut through Bulkhead Shoal will be reasonably permanent. Experience has shown that the bar at the mouth of the Apalachicola River will require redredging at least once in two years unless the cut is made deeper and wider than has been hitherto possible with the funds available. It is possible that a deeper and wider cut may be more permanent.

The commerce of Apalachicola Bay consists mainly in the exportation of lumber, which is transported from the mainland to the anchorage grounds in lighters and rafts, towed by tugs drawing from 5 to 7 feet of water. When the depth in the channel across the bar is reduced below 7 feet much trouble is experienced in carrying on the business of the port.

It is estimated that $50,000 can be profitably expended at this point during the ensuing fiscal year.

COMMERCIAL STATISTICS.

[Furnished by the collector of customs.]

	No.	Tonnage.
		Tons.
Vessels entered	142	66,683
Vessels cleared	153	71,575
Number of vessels employed in the traffic of Apalachicola, Fla		160
Amount of superficial feet of timber and lumber exported		60,238,900
Estimated number of vessels and river steamers arrived and departed		700
Estimated tonnage of above vessels		88,150
Value of exports to foreign ports		$392,389.00
Value of exports to coastwise ports		381,000.00
Total value of exports		773,389.00
Value of imports from foreign countries		156.45
Value of imports from coastwise ports		250,000.00
Total value of imports		250,156.45
Total value of imports and exports		1,023,545.45
Estimated value of exports and imports to or from coastwise ports by sail vessels and river steamers which do not enter or clear from the custom-house:		
Exports		1,125,000.00
Imports		1,450,000.00

There are six sawmills here, which can turn out 350,000 superficial feet of lumber a day, with shingle attachments, which turn out 250,000 shingles per day; three oyster-canning factories, with a capacity of 60,000 cans per day; one fish-packing establishment, which packs about 6,000 barrels of salted and pickled fish per annum; one ice factory. manufacturing 7 tons per day.

HARBOR AT PENSACOLA, FLA.

The improvement of this harbor was commenced in 1878 by the removal of certain wrecks forming obstructions to navigation. The present plan of improvement, adopted in 1881, contemplates dredging a channel 300 feet wide and 24 feet deep at mean low water across the inner bar, for the temporary relief of navigation of this harbor, and the preservation of the site of old Fort McRee by the construction of suitable works of shore protection, with a view to retaining this position for defensive purposes and preventing further changes in the tidal currents through the continued abrasion of the shore at this point.

The expenditure up to June 30, 1892, of $260,810.56 had resulted in obtaining, temporarily, a channel across the inner bar, reported to be 120 feet wide and 24 feet deep, at mean low water, at the conclusion of dredging operations in 1886.

This channel had shoaled to a least depth of 19 feet in June, 1891, and was then redredged to a least depth of 20.5 feet. In November, 1892, the channel had again shoaled to a least depth of 19.2 feet. The further abrasion of the western shore line near Fort McRee was stopped by the construction of two groins north of the fort and nearly at right angles to the shore, having lengths of 360 and 220 feet, respectively. The groins were built of stone and concrete and were completed in April, 1890.

During the year ending June 30, 1893, $5,895.59 was expended in the care and preservation of the property belonging to the improvement and in dredging on the inner bar in accordance with the requirements of the appropriation act of July 13, 1892. This dredging is now being done with a suction dredge under contract which required the work to begin not later than January 1, 1893, and to be completed by January 1, 1894. The time for beginning work was extended to May 11, 1893.

The Chief of Engineers, in his recent annual report, says: "The dredging is now being carried on continuously night and day and without accident. It is expected that the available funds will be exhausted by September 15, and that a channel 24 feet in depth and from 200 to 225 feet in width will have been secured across the inner bar; but for the reasons given in the report of the officer in charge it seems probable that this channel may soon fill up, by reason of the steady growth of the middle ground to the southward."

It is estimated that $500,000 can be profitably expended at this point during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The following statement of the business of the port of Pensacola, for the fiscal year ending June 30, 1893, has been furnished by the collector of customs:

Lumber exported.....feet, B. M..	336, 995, 000
Value of exports to foreign ports	$3, 805, 967
Value of exports to coastwise ports	468, 705
Total exports	4, 274, 672
Value of imports from foreign ports	6, 517, 581
Total exports and imports	10, 792, 253
Duties on imports and miscellaneous collections	27, 938

Vessels entering and clearing.

Vessels entering from foreign ports	460
Vessels entering from coastwise ports	89
Total entering	549
Vessels clearing for foreign ports	479
Vessels clearing for coastwise ports	86
Total clearing	565
Vessels employed in traffic of port	168

The foreign sailing tonnage exceeds that of all the other Gulf ports combined, including New Orleans. Existing railroads are extending their lines, and new roads, projected or in process of construction, will afford ample facilities for communication with the interior. The importance of Pensacola from a military and naval standpoint has long been recognized, and considerations of defense as well as those governed by commercial necessities demand the improvement of the entrance to its harbor.

ENTRANCE TO HARBOR AT KEY WEST, FLA.

The Florida Keys form a reef of rocks and sand islands extending from Cape Florida westward a distance of nearly 200 miles. Starting from the easterly end, this reef curves to the westward about 165 miles, on a radius of about 150 miles to a point near Key West, from whence it continues in a nearly straight line due westward about 65 miles farther, to the Tortugas. It thus forms a huge, partially submerged dam, so to speak, over which the tides ebb and flow.

Between the chain of reefs and the Island of Cuba is the Strait of Florida, perhaps the most difficult and dangerous pass, considering its width and depth, to be found on the globe. It is the dread of mariners, the evidence of its dangers being found in the numerous wrecks scattered along its line. The current of the Gulf Stream, always easterly in direction at this place, attains at times a velocity of over 4 nautical miles per hour between the reefs and Cuba, so that navigation westward for sailing vessels is most difficult. In clear weather the coast line is well defined by light-houses, but the reefs extend miles beyond the latter, so that when concealed by the state of the weather these light-houses serve no useful purpose. The currents, swift at all times, are often unreliable in direction, sweeping toward a reef, the proximity of which is learned only too late. This strait is also the region of hurricanes, any one of which makes forcibly evident the importance of a harbor of refuge.

The island of Key West is itself a limestone rock which, though not generally useful as a building material, is well adapted to such constructions as the interior of a jetty. This rock, easily quarried, is found in practically inexhaustible quantities. The abundance of this material so close at hand has an important bearing on the cost of any work of improvement in this vicinity.

Starting at Whitehead Spit, the southwest extremity of Key West Island, a broad, nearly straight, and deep channel called the Northwest Passage extends for about $7\frac{1}{4}$ miles in a northwest direction across the reef toward deep water of the Gulf. A bar is then encountered having a least depth of only 11 feet at mean low water. The least distance between the exterior and interior 18-foot curve but little exceeds a mile,

but the channel over the bar being oblique in direction, the sailing distance is increased to about 1½ miles.

During storms the available depth is so much reduced that vessels bound to and from gulf ports can not use it, but are compelled to make a detour of about 100 miles by Dry Tortugas to enter or leave the gulf.

An examination of the entrance, with a view to its improvement, was made in 1867 and again in 1881. In 1882 Congress made an appropriation of $25,000 for dredging a channel 300 feet wide and 17 feet deep across the bar. As was anticipated, the improvement was only temporary.

In the act approved August 5, 1886, $2,500 was appropriated for a new examination and survey of the bar. This was made in December, 1886, and January, 1887. The bar was found to be formed and maintained by interfering tidal currents. The project for its improvement comprised the construction of one or more training walls, with dredging, if necessary.

In the act of August 11, 1888, Congress appropriated $25,000 for this work, with the proviso that the Secretary of War should appoint a board of 3 engineer officers, who should consider the subject and report on the advisability of continuing the work under the above project, and that he should submit the report, together with the views of himself thereon, to Congress at its next session.

The board was of the opinion that the work is of national importance. It recommended that the improvement be begun by the immediate construction of a jetty along the northeast side of the entrance.

Up to the close of the fiscal year ending June 30, 1892, $64,881.40 had been expended on the present project.

Work under the appropriation of 1890 was continued until May 12, 1892, when the contract was completed. Twenty-six thousand eight hundred and twenty-one and nine-tenths cubic yards of stone was placed in the jetty during the fiscal year ending June 30, 1892, making a total of 27,982.2 cubic yards in the jetty.

Work under the appropriation of July 13, 1892, was begun June 1, 1893. By June 30, 2,969 cubic yards of stone had been placed in the jetty, extending the foundation layer seaward a distance of 1,028 feet.

During the year the crest of the jetty has been lowered by the action of the waves on an average of 0.5 foot.

The total length of the jetty is 7,916 feet, having a depth over it at mean low water varying from 3½ feet to 11½ feet and averaging 6 feet. There is practically no change in the condition of the channel as reported last year.

It is estimated that $385,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Commerce of harbor at Key West, Fla., for the year ending December 31, 1893.

[Furnished by Mr. George Phillips, Key West, Fla.]

Articles.	Gross tonnage.	Estimated value.
Fertilizers	70,004	$70,004
Fish and oysters	2,000	100,000
Fruits	51	12,500
Grain	25,000	500,000
Hides	13	20,000
Lumber:		
Rough	4,125	150,000
Sawed	8,250	450,000
Merchandise	100,000	18,000,000
Ship stores	100	250,000
Vegetables	10,000	300,000
Pineapples, plantains, etc	9,000	325,000
Total	228,543	20,177,504

Vessels.	Number.	Average tonnage.	Average draft.
		Tons.	*Feet.*
Steamers	1,000	1,400	10
Sailing	5,000	20	6

Number of passengers carried, 45,000.

HARBOR AT ST. AUGUSTINE, FLA.

The approved project is to protect the shores from erosion by the construction of groins of concrete and riprap on brush foundation mattresses.

Three appropriations, aggregating $65,000, have been made for this harbor, and two of them, amounting to $55,000, have been expended in accordance with this project.

Work under the first appropriation was begun in October, 1889, and ended in September, 1890.

Work under the second appropriation was commenced in December, 1890, and ended in May, 1891.

The amount expended up to June 30, 1892, was $53,720.40.

Five groins in all have been built; one 341 feet long and another 523½ feet long, on Anastasia Island, near the light-house; one 548.9 feet long, one 465 feet long, and one 415 feet long, on North Beach, near the point.

During the year 1892 a sheet-pile wing dam, 327 feet long, was built on the south side of Groin No. 4.

The shore lines have continued to build out, excepting in the vicinity of Groin No. 4 and on the west side of Groin No. 2, where slight erosions have taken place.

The act of July 13, 1892, appropriated $10,000 for this improvement. With this sum it is proposed to construct two additional groins and some necessary wing walls. Work on these groins is now in progress.

Local changes having occurred, it appeared that the estimate of the existing project would not complete the needed protection, and accordingly a revised estimate has been adopted calling for an additional appropriation of $30,000, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS FOR YEAR ENDING DECEMBER 31, 1892.

Articles.	Gross tonnage.	Estimated value.	Articles.	Gross tonnage.	Estimated. valne.
Fertilizers	100	$3,000	Lumber (sawed)	2,000	$12,000
Fish and oysters	400	6,500	Merchandise	18,000	800,000
Fruits (oranges and grapes)	350	10,000	Vegetables	300	12,000
Grain	700	21,000			
Hay	1,500	28,500	Total	23,450	898,000
Honey, sirup, etc	100	5,000			

Vessels.	Tonnage.	Draft.
	Tons.	*Feet.*
City of St. Augustine, steamer	720	10½
Schooners (4)	350	10
Schooners (2)	80	8

Estimated percentage of total trade of neighborhood carried by water, 20 per cent.

CHARLOTTE HARBOR AND PEASE CREEK, FLORIDA.

The portion under improvement lies between the Boca Grande entrance from the Gulf of Mexico and the wharves at Punta Gorda, 2 miles from the mouth of Pease Creek. The available depth at the entrance is 19 feet at mean low water. Immediately within the entrance there is an anchorage with a depth of 18 feet and over. Between that point and the Punta Gorda, a distance of 24½ miles, the channel depth varies from 10 to 20 feet. In the act of September 19, 1890, $35,000 was appropriated for improving the channel between the limits named. A survey of the defective portions of the channel was made, a project was prepared for its improvement, and a contract entered into for doing the work. The approved project contemplates the immediate formation of a channel 12 feet deep and as wide as the funds will permit. The estimated cost of a channel 200 feet wide and 12 feet deep is $127,500; of a channel 200 feet wide and 15 feet deep $468,000.

The amount expended up to June 30, 1892, was $3,223.95.

It was decided to expend the money available in deepening the channel from the wharf at Punta Gorda to Beacon No. 2, a distance of about 10,000 feet. The depth of water in this portion of the channel varied from 10 feet at the wharf to 12 feet at Beacon No. 2. It was estimated that the amount available was sufficient to excavate a channel 300 feet wide for a distance of 300 feet in front of the wharf and 100 feet wide from that point to Beacon No. 2 to a depth of 12 feet.

Work under contract was begun April 17, 1893, and the dredging was completed June 20, 1893.

One hundred and forty-one thousand two hundred and ninety-three cubic yards of material was removed. Of this amount 34,296 cubic yards was dredged in excess of a depth of 13 feet. The work has resulted in the formation of a channel 300 feet wide for a distance of 300 feet in front of the wharf at Punta Gorda, 160 feet wide for a distance of 4,729 feet, and 120 feet wide for a further distance of 1,764 feet, where it connects with the 12-foot contour. The total length of the dredge cut is 6,793 feet. Over nearly the entire area dredged the depth is in excess of 13 feet.

It is estimated that $92,500 will be required to complete the existing project, and that $50,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Commerce of Charlotte Harbor and Pease Creek, Florida, for the year ending December 31, 1892.

Articles.	Gross tonnage.	Estimated value.	Articles.	Gross tonnage.	Estimated value.
Cattle	240	$24,000	Lumber	216	$1,152
Coal	648	3,240	Meal and grits	200	8,000
Flour	2,088	58,860	Oranges	40	2,000
Fish:			Phosphate (pebble)	76,580	459,480
Salted	320	19,200	Salt	280	9,600
Iced	2,480	74,400	Sundry packages	2,318	69,562
Grain (corn and oats)	3,830	62,411			
Hay	90	1,800	Total	89,330	793,705

Total tonnage entered and cleared at the port of Punta Gorda, Fla., for the year ending December 31, 1892.

	Entered.		Cleared.	
	No.	*Tons.*	*No.*	*Tons.*
Steamers	74	53,521.04	74	80,404.90
Sailing vessels	110	23,995.09	110	36,224.76
Total	.....	77,516.13	.....	116,629.66

HARBOR AT MOBILE, ALA.

Prior to the Governmental improvement of this harbor the channel had a minimum depth of 5½ feet through Choctaw Pass and 8 feet on Dog River Bar. This was deepened to 10 feet through both by dredging, under appropriations from 1826 to 1852 of $228,830.68. In 1860 the channel in Choctaw Pass had shoaled to 7½ feet. From 1870 to 1878 the channel was deepened by dredging to 13 feet, under appropriations amounting to $401,000. Length of cut, 8 miles.

From 1881 to 1888 the channel was deepened by dredging to 17 feet, under appropriations amounting to $740,000, but this project was not completed when the last project was adopted. The length of cut was 25.91 miles.

The present project for the improvement of this harbor was adopted in 1888, the object being to afford a channel of entrance from the Gulf of Mexico to the city of Mobile of 280 feet width on top of cut with a central depth of 23 feet at mean low water, by dredging, at an estimated cost of $1,980,000. The act of 1890 extended the work up Mobile River to the mouth of Chickasabogue Creek, and increased the estimated cost to $2,043,800. The entire length of channel under present project is 33.09 miles, and the entire length of continuous cut is 32.27 miles. The amount expended on the present project up to the close of the fiscal year ending June 30, 1892, was $581,878.55.

The average central depth of the dredged channel on June 30, 1892, was 24 feet, and the minimum depth on that date was 20.2 feet. The amount expended during the fiscal year ending June 30, 1893, was $178,319.38, and on that date the average central depth of the entire channel was 23.89 feet by the new gauge and 25.59 feet by the old gauge, and the minimum central depth was 19.6 feet by the new gauge and 21.3 feet by the old gauge, with an increased or botton width wherever excavated of from 20 to 80 feet.

The river and harbor act approved July 13, 1892, authorized contracts to be entered into for completion of the present project of

improvement for this work, to be paid for as appropriations may from time to time be made by law.

It is estimated that $681,300 will be required to complete the existing project, that $180,000 will be required for the preservation of improvement, and that $681,300 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Description.	Entries.						Clearances.					
	1893.			1892.			1893.			1892.		
	No.	Tons.	Crew.	No.	Tons.	Crew.	No.	Tons.	Crew.	No.	Tons.	Crew.
Foreign	234	150,231	3,150	156	108,190	2,107	229	152,626	3,373	164	121,229	2,309
Coastwise ..	125	90,363	2,501	151	100,235	2,789	131	94,143	2,594	134	82,300	2,322
American ..	104	36,567	824	68	23,890	503	119	47,151	1,018	80	28,321	595
Total .	463	277,161	6,475	375	232,315	5,399	479	293,920	6,985	378	231,850	5,226

Imports and exports.

Description.	1893.	1892.
Duties on imports	$15,108.88	$7,949.72
Tonnage dues	8,610.02	6,429.42
Hospital collections	.....	328.00
Care and treatment of foreign sailors and overtime of officers	430.00	.....
Official fees	2,052.53	.....
Fines, penalties, and miscellaneous	230.60	1,418.39
Total collections	26,432.03	16,125.53
Exports	3,319,381.10	2,790,014.00

MOUTH AND PASSES OF CALCASIEU RIVER, LOUISIANA.

Previous to the governmental improvement here, there was not to exceed 3 feet depth over the bars in Calcasieu Lake.

In 1888 and 1890 there was appropriated $10,000 and $75,000 respectively, but as the permanency of the channels required that they be protected by a revetment of some kind, and as the kind of construction indicated in the act could not be safely undertaken with so small a sum, both appropriations were held for further increase.

The approved project contemplates the dredging of suitable channels 12 feet deep through the head and foot of Calcasieu Lake and revetting these channels to prevent the return of the dredged material, and to build parallel piers of brush and stone at the entrance to the outer pass, extending from the shore on either side to the deep water of the gulf, and to dredge between these piers, if necessary. The estimated cost of the improvement was placed at $600,000.

To June 30, 1892, there had been expended on the improvement of this stream the sum of $46,564.60.

In 1892 $100,000 was appropriated for the improvement of the river and pass, and contracts were accordingly let for the construction of a jetty upon the east side of the channel across the bar in the gulf, and for the construction of a revetment to protect a channel to be dredged through the bar at the head of the pass.

The revetment will be about completed in July, 1894, when the dredging will be immediately commenced by the Government dredge,

bids having been invited for this work and having been deemed unreasonable.

The east jetty has only been built out a distance of 1,104 feet from the shore, owing to very unfavorable weather.

The improvement when completed will be of considerable benefit to commerce, and, besides the deepening of the water across the bar in the gulf, will permit vessels to enter the pass for refuge during stormy weather.

The amount expended on this work during the year ending June 30, 1893, was $9,898.35.

It is estimated that $425,000 will be required to complete the existing project, and that $350,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

[From June 1, 1892 to May 31, 1893.]

Number of steamers	10	Number of barges	10
Number of trips made	1,040	Number of trips made	500
Gross tonnage	248,560	Gross tonnage	15,000
Number of schooners	30	Total number of vessels	1,630
Number of trips made	90	Total tonnage	267,160
Gross tonnage	3,600		

The large shipments of lumber heretofore made to Mexican and Central American ports can not be made now, because it is claimed that the depth of water on the bar will admit only the lighter class of vessels.

Receipts and shipments.

Articles.	Tons.	Value.
Lumber	180,000	$990,000
Shingles	6,000	60,000
Cotton	525	68,250
Cotton seed	550	6,600
Rice	252	6,000
Merchandise	20,218	1,010,900
Total	207,545	2,141,750

SHIP CHANNEL IN GALVESTON BAY, TEXAS.

This is a channel dredged by the U. S. Government from Bolivar Channel to Morgan Cut, the latter terminating at a point 4.8 miles from Morgan Canal, an excavation across Morgan Point at the mouth of the San Jacinto River. Morgan Cut and Canal were formerly the property of the Buffalo Bayou Ship Channel Company, but were purchased by the United States and the transfer was made May 4, 1892.

The natural depth on the line of the Galveston Bay Ship Channel averaged 8½ feet at mean low tide, with a depth in some places of but 7 feet; the ruling depth in Morgan Cut was 7½ feet, and in the canal 17 feet.

The project for this improvement was adopted in 1871, modified in 1877, and again modified in 1892. This latter modification became necessary owing to the acquisition by the United States of the Morgan Cut and Canal. The object of the improvement is to excavate and maintain a channel, 100 feet wide at the bottom and 12 feet deep, from Bolivar Channel to the San Jacinto River, a distance of 24.33 miles, thereby giving an outlet to the commerce of Buffalo Bayou, of San Jacinto River, of Trinity River, and of Cedar Bayou.

A channel, having a least width of 100 feet and depth of 12 feet, was excavated from Bolivar Channel to Morgan Cut in 1888 and 1889, this

being the first work that was done since operations were suspended in 1883.

No dredging was done from July, 1889, to the end of the last fiscal year; consequently the channel shoaled to an average depth of 8 feet.

The amount expended to June 30, 1892, on this improvement was $540,831.16, and during the fiscal year ending June 30, 1893, the sum of $16,484.64 was expended in sloping the banks of Morgan Canal, which required the removal of 12,550 cubic yards of material, and in completing the revetment on the west bank of the canal, the length constructed being 1,959 linear feet. This work prevented further erosion of the banks of the canal. No dredging was done, the contractor's plant having met with an accident while en route to Galveston, and repairs were not completed at the close of the fiscal year. There was no change in channel depths from those previously reported.

It is estimated that $269,675.44 will be required to complete the requisitions of the existing project, and that $200,000 can be profitably expended during the ensuing fiscal year.

The project is not capable of permanent completion, it being estimated that the sum of $100,000 will be required annually to maintain the channel after it has been fully excavated to the required width and depth.

COMMERCE.

It is not practicable to give exact statistics of the commerce through the ship channel. Almost the entire floating commerce of Buffalo Bayou, of San Jacinto River, of Trinity River, and of Cedar Bayou is carried through this channel.

CHANNEL IN WEST GALVESTON BAY, TEXAS.

The channels through West Galveston Bay were originally dredged in 1859 by the State of Texas to a depth of 5 feet, but during the storm of 1875 they shoaled to a depth of from 2½ to 3 feet at mean low tide, and at the same time became too narrow to allow vessels to pass through them except at full tide. Subsequent storms probably caused further filling of the channels.

The project for this improvement was adopted in 1892 and consisted in widening, deepening, and straightening the channel by dredging, so as to afford a least width of 200 feet and depth of 3½ feet between the railroad bridges and San Louis Pass in the bay, and a least width of 100 feet and depth of 3 feet along Christmas Point, the channel to be marked by suitable beacons. The total estimated cost is $28,998.80.

No money was expended on this improvement up to the close of the fiscal year ending June 30, 1892, consequently there was no change in the condition of the channel, except possibly a further filling due to wind and currents.

The amount expended during the fiscal year ending June 30, 1893, was $2,317.71, mostly in erecting beacons and inspecting dredging done by contract.

The small amount of material removed by the contractor during the year, 2,928 cubic yards, was not enough to benefit commerce to any great extent.

It is estimated that $14,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS OF WEST GALVESTON BAY, TEXAS, FOR FISCAL YEAR ENDING JUNE 30, 1893.

Seven steamers and tugs navigate West Galveston Bay. Length, 39 to 141 feet; draft, 3 feet to 5 feet 6 inches; tonnage, from 5 to 240. In addition to this a number of sailing vessels navigate it; a list of their names and dimensions could, however, not be obtained.

Amount and value of freight transported.

Articles.	Tons.	Approximate value.
Cotton and cotton seed	1,810	$283,560
Lumber	537	15,232
Cattle	200	4,000
General merchandise	2,350	319,687
Total	4,897	622,477

HARBOR AT SABINE PASS, TEX.

Originally there was scarcely 6 feet depth of water on the bar at the entrance to Sabine Pass, and as the bar was composed of very soft mud all efforts to maintain a channel through it of 12 or 16 feet depth by dredging were unavailing.

In 1882 a project for the improvement of this entrance was approved. It provided for the construction of jetties on either side of a channel connecting the deep water of the pass with that of the gulf.

The estimated cost of this improvement was $3,177,606.50.

Since the approval of this project there has been appropriated $1,448,750. A total of $1,319,848.48 had been expended to June 30 1892, of which sum $999,848.48 was expended under the present project'

The east jetty has a total length of 17,100 feet, 16,650 feet of which has been raised to 2 feet above mean high water. The outer 450 feet is foundation work only.

The west jetty has now a length of 12,840 feet, 6,609 feet of which has been raised to 2 feet above mean high water, and the remainder is only built to the level of mean low water and is incomplete.

In the beginning the jetties were built of alternate layers of brush and stone, but the rapid disappearance of the brush led to the adoption of the present method, which is, first to lay a brush mat and then build a riprap structure on this reaching 2 feet above mean high water.

The material between the jetties is not easily eroded by the currents, and accordingly dredging has been resorted to to expedite the deepening. At present a dredged channel 16 feet in depth extends through the center of the channel span to within 1,500 feet of the end of the east jetty. This channel would have been extended clear through to the 16-foot curve of depth in the gulf if unfavorable weather had not prevented.

A considerable deepening of the channel has occurred from natural scour, and the manner in which this material has been carried clear of the entrance confirms the belief that a channel dredged beyond the extremities of the jetties will not be obliterated for some time.

At mean low water there is now an unobstructed channel into the pass of over 11 feet. Vessels, however, enter and leave safely drawing 2 feet more than this, owing to the very sott material composing the bar.

The amount expended on this work during the year ending June 30, 1893, was $208,745.31.

It is estimated that $1,728,856.50 will be required to complete the existing project, and that $1,000,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

[From June 1, 1892, to May 31, 1893.]

Vessels 45
Number of trips 241
Tonnage 6,853
Draft of heaviest vessels, light, 8 feet; loaded, 14 feet 4 inches.

RECEIPTS AND SHIPMENTS FOR TWO YEARS.

Articles.	Year ending May 31, 1892.		Year ending May 31, 1893.	
	Tons.	Value.	Tons.	Value.
Shipments.				
Cotton	20	$3,200	.....	.....
Hides	10	1,000	.....	.....
Lumber	23,951	179,632	9,780	$117,060
Merchandise	.....	.....	450	22,500
Total	23,981	183,832	10,230	139,560
Receipts.				
Rock	14,047	42,131	3,290	9,870
Coal	.....	.....	950	3,800
Merchandise	.....	.....	500	25,000
Brick	.....	.....	80	2,720
Total receipts and shipments	38,028	225,963	15,050	180,950

HARBOR AT ASHTABULA, OHIO.

The development of Ashtabula Harbor as a shipping point for ore brought from the upper lakes, and for coal on return trips, has been remarkable. It is now the largest shipping point on Lake Erie for these commodities. The coal and ore handled at this harbor in 1892 amounted to 4,250,000 tons.

The Lake Shore and Michigan Southern and the Pennsylvania Railroad companies have expended large sums in improving these facilities for transfer of coal and iron.

During the past six or eight years the tonnage of the harbor has more than tripled itself, while the number of vessels arriving has more than doubled itself, thus indicative of an increased draft and size of vessels visiting this port. In 1826 there was a depth of only 2 feet over the bar at the mouth of Ashtabula River, and the rock bottom was but 9 feet below the lake surface.

Improvements were then commenced by confining the channel between piers of timber crib work filled with stone. The work was modified and extended from time to time, as the necessities of commerce developed, until the latest project, adopted in 1890 and amended in 1891, which contemplates widening the harbor entrance by moving part of the east pier 45 feet eastward, extending both piers to a depth of 22 feet in the lake, and deepening the channel to 20 feet.

The removal of east pier 45 feet will make the width between piers 213 feet, instead of 205 feet, as indicated in former reports.

The expenditures from 1826 to June 30, 1892, were $319,503.08. The result was a channel 165 feet between piers and a depth of 17 feet in

the middle, subject to the formation of bars at entrance by freshets and storms.

In October, 1892, a contract was let for removal of 242 linear feet of old pier and replacing it on a line 45 feet east of former location; also to extend east pier 240 feet and west pier 200 or more feet. At the end of the fiscal year the removal and rebuilding of old pier was a little more than two-thirds accomplished, and the framing of cribs for extending piers was well advanced.

In March, 1893, a contract was concluded for dredging the channel through the bar in anticipation of the result of spring freshets and storms. The amount of dredging was less than usual and was completed early in June.

The work under contract will be completed in the season of 1893.

It is estimated that $255,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The following statistics for the year 1892, relative to the commerce of the harbor at Ashtabula, Ohio, were compiled from information furnished by the collector of customs and others:

	Tons.
Receipts: Iron ore	2,769,000
Shipments: Coal	1,462,000

Shipping.	No.	Tonnage.
Vessels entering	1,518	.....
Vessels departing	1,527	.....
Vessels built	3	18
Total tonnage for 1892		4,231,000
Tonnage given in last annual report		2,500,000
Increase		1,731,000

Draft of largest vessel using the harbor, 18 feet.

The depth of water in the harbor prevents the largest vessels from loading to full depth.

HARBOR AT THE MOUTH OF BLACK RIVER, OHIO.

This harbor, on which is located the thriving town of Loraine, is situated on Lake Erie, at the mouth of the Black River, about 25 miles west of Cleveland. It has a prosperous and gradually increasing commerce.

In its natural condition, the river had a depth of but 3 feet on the bar at its mouth.

Improvements upon this harbor were commenced in 1828 by extending parallel piers or jetties across the bar to protect and confine the channel. Various amendments and additions to the plan have been made from time to time. In 1891 the extension of piers to 17 feet depth in the lake was recommended by the officer in charge of this improvement.

The entire amount expended in improving this harbor to June 30, 1892, was $232,204.77. As a result the piers have been extended to a depth of about 16 feet in the lake, and the channel ordinarily had a clear depth of 16 feet in the middle. This is, however, subject to fluctuations, and it is usual for a bar to form at the entrance during the fall, winter, and spring, so that a small amount of dredging is annually required.

The expenditures of the last year have been $1,784.11.

In November, 1892, there was a good channel 16 feet deep, except at the entrance, where a bar had recently formed, reducing the depth at that point to 14 feet. A dredge was therefore employed and the channel through the bar was dredged to a depth of 17 feet and width of 140 feet.

The old east pier had been so much injured that it became necessary to remove and rebuild a section of 120 feet length. Repairs were also required on west pier. A contract has been let for making these repairs and for extending the piers as far as the balance of funds will permit. The repairs and maintenance of channel by dredging will cost not less than $10,000, leaving but one-half on the last appropriation to be applied on the extension of piers. Work under the contract was calculated to have been completed by November 30, 1893.

It is estimated that $46,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The following statistics for the year 1892, relative to the commerce of the harbor at mouth of Black River, Ohio, were compiled from information furnished by the collector of customs and others:

Receipts.	Tons.	Shipments.	Tons.
Iron ore	187,000	Coal	35,200
Lumber	9,234		
Total	196,234	Total	35,200

Vessels entering, 285; departing, 314.

Draft of largest vessels using harbor, 16 feet.

Largest vessels do not load to full depth.

Fully one-third more vessels enter and leave the harbor, of which no record is kept.

Total tonnage reported, 548,234; tonnage reported from 1891, 738,747.

HARBOR AT CLEVELAND, OHIO.

The city of Cleveland, situated on this harbor, at the mouth of the Cuyahoga River, is the second largest city of Ohio, having in 1890 a population of 261,000. Cleveland is the center of an important system of railroads branching out in all directions, and is also connected by canal with the Ohio River at Portsmouth. It has now more than 400 manufacturing establishments, devoted largely to the iron and oil interests. Pork-packing has also recently grown to importance.

In 1825 the mouth of the Cuyahoga River, which now forms the interior harbor, was obstructed by a long sand bar, the channel was crooked, and the depth of water over the bar was but about 3 feet.

A project of improvement was adopted to straighten the river at its mouth and was completed in 1869.

In 1875, in accordance with an act of Congress, a project was adopted for a harbor of refuge, as the harbor in the river afforded no anchorage. The project as amended includes two breakwaters, one east and one west of the channel entrance. The west breakwater was completed in 1883; its length, including shore arm and spur, is 7,278 feet. Previous to June 30, 1892, the east breakwater had been extended a distance of

2,043 linear feet, besides a spur of 118 feet length near the entrance The harbor now affords a good refuge and anchorage.

The total expenditure to June 30, 1892, which includes maintenance of channel and piers, was $1,167,118.25.

A survey of the harbor was made in August, 1892, which showed that a large amount of dredging was required to clear the channel and improve the anchorage. A part of the last appropriation is therefore to be expended for this purpose.

In October, 1892, a contract was made for 450 feet extension of the east breakwater. At the end of the fiscal year 150 linear feet had been put in position and raised to the mean lake level. The remainder will be completed in the season of 1893.

In November, 1892, it became necessary to dredge in channel where a bar had formed. This was done by hiring a dredge by the day, as the time did not permit of doing the work by contract.

In March, 1893, a contract was made for dredging in Cleveland Harbor in connection with similar work at Fairport and Ashtabula harbors. Work under this contract was commenced May 1, and was still in progress at the closing of the report of the Chief of Engineers for 1893. It is estimated that $494,000 will be required to complete the existing project and that $200,000 can be profitably expended during the ensuing fiscal year.

HARBOR AT FAIRPORT, OHIO.

The city of Fairport is situated at the mouth of Grand River, on Lake Erie, about 30 miles northeast of Cleveland. Its harbor is now third on the list of Lake Erie harbors in order of amount of ore received and coal shipped, and the amount of this commerce bids fair to increase still more as other railroad companies are preparing to build to said harbor.

The commerce of the harbor has wonderfully increased each succeeding year for the last decade.

In 1825 the sand bar across the mouth was so hard and dry in the summer that teams could be driven across. In that year a plan was adopted for improving the harbor by the method of parallel piers to confine and protect the channel. The plans have been modified and extended from time to time until 1890, when the latest project was adopted providing for extending the parallel piers to a depth of 18 feet in the lake, with the dredging needed to secure a channel of same depth.

At the time the latest project was adopted the channel depth between piers was 16 feet, and over the bar 15½ feet.

The total expenditures for construction, maintenance, and repairs to June 30, 1892, were $319,503.08.

In November, 1892, the bar had formed at mouth of river so that it became necessary to dredge the channel.

In March, 1893, a contract was let for such dredging as might be required in the spring of 1893. Dredging, under the contract, was commenced June 6 and continued through the month.

A contract for extension of east and west piers, each 120 feet, was let in December, 1892, after inviting proposals by public advertisement. Framing of timbers was commenced early in June, but no cribs were sunk previous to June 30. This work will be completed in the season of 1893.

The estimate for completion of project is for cost of piers only. A

considerable amount of dredging is required annually for keeping the channel clear over the bar. The superstructure of part of the old work is in bad condition, and should be rebuilt.

It is proposed to expend the sum which may be appropriated for such repairs and dredging as may be indispensible, and for extension of piers, as far as possible, toward the depth of 18 feet.

It is estimated that $190,000 will be required for the completion of the existing project and that $100,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The following statistics for the year 1892, relative to the commerce of the harbor of Fairport, Ohio, were courteously furnished by the collector of customs and others.

	Tons.
Receipts:	
Iron ore	866,713
Flour	69,639
Merchandise	29,722
Wheat	14,030
Corn	8,355
Total	988,459
Shipments:	
Coal	114,738

Shipping.	No.	Tonnage.
Vessels entering	643	763,808
Vessels departing	635	751,703
Total		1,515,511

Tonnage given in last annal report (estimated), 1,300,000 tons.

HARBOR AT HURON, OHIO.

Huron Harbor is situated at the mouth of the Huron River, on Lake Erie, about 10 miles east of Sandusky, and is one of the best natural harbors on the lake.

The commerce of this harbor has been greatly aided by the improvements, and has made wonderful strides during the last decade.

In 1826 the mouth of the river was closed by a sand bar. Improvements consisting of parallel piers to confine and protect the channel was then undertaken.

The project has been modified and extended from time to time as the demands of commerce required. The latest project, approved in 1890, consists in extending the piers to the contour of 16 feet in the lake with the view of obtaining that depth at the entrance and between the piers.

The total amount expended from 1826 to June 30, 1892, was $139,273.71. As a result the channel had been recovered from a sand bar sometimes dry and given a depth ordinarily 16 feet or more between piers about 140 feet apart; the depth outside of piers is, however, somewhat less, except where recently dredged.

The amount expended in last fiscal year is $227.97.

A survey of the habor having been made in October, 1892, a contract was let for extending the east pier 80 feet and west pier 40 feet. Work under contract was commenced in June, 1893, and, having progressed satisfactorily, was to have been completed in the following August.

A contract has also been let for the small amount of dredging which will be required to clear the channel through the bar.

Dredging and repairs of old work are found necessary from time to time, but definite estimates can not be submitted in advance.

The estimate for completion of project covers the original cost of extending the piers to the depth of 16 feet in the lake.

The expenditures of last fiscal year have been for a survey, advertising, and contingent office expenses.

It is estimated that $114,000 will be required to complete the existing project, and that $50,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The following statistics for the year 1892, relative to the commerce of the harbor at Huron, Ohio, were compiled from information furnished by the collector of customs and others.

Receipts.	Tons.	Shipments.	Tons.
Iron ore	68,612	Lump coal	74,819
Salt	300	Wheat	570
Lumber	2,100	Timber	650
Hard coal	260		
Telegraph poles, railroad ties, and fence posts	1,200		
Total	72,472	Total	76,039

Total tonnage of receipts and shipments, 148,511 tons.

Shipping.	No.	Tonnage.
Vessels entering	170	92,011
Vessels departing	157	91,198
Total	.....	183,209

The aggregate tonnage of receipts and shipments was stated in last annual report 151,000 tons.

HARBOR AT PORT CLINTON, OHIO.

Port Clinton, Ohio, situated on this harbor, 14 miles northwest of Sandusky, has a population of about 2,000. It is on the Lake Shore Railroad and at the mouth of the Portage River.

Previous to Governmental improvement the channel at the entrance to this harbor was narrow and intricate, with a depth of only 5 feet.

The present project, adopted in 1875, provides for a pile revetment from the north shore of the Portage River, opposite the town, 967 feet into the lake, and two pile piers 200 feet apart, of an aggregate length of 4,100 feet, extending to the depth of 10 feet in the lake, with a view of maintaining a depth of 9 feet between them.

The total expenditures to June 30, 1892, amounted to $66,000.

As a result the east and west piers have been extended to within 420 feet and 480 feet of completion, respectively.

The act of July 13, 1892, appropriated $10,000 for improving this harbor, with a condition that $1,200 of the amount be paid to Charles Roose, of Oak Harbor, Ohio, in full satisfaction for the necessary portion of the sand beach adjoining the inner end of the west revetment.

The land has been surveyed and deeds made out in complete form, but the payment has not been made because of delay in examination of title by the United States attorney.

A contract has been made for widening the channel of 10 feet depth by dredging. Work is to be completed on or before November 30, 1893.

The piers are now very rotten, and unless soon repaired will go to complete ruin. The officer in charge recommends that the project be not completed, but that the amount estimated therefor be expended in much-needed repairs.

It is estimated that $27,000 will be required to complete the existing project and that $27,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Receipts.	Tons.	Shipments.	Tons.
Merchandise, stone, wood, coal, staves, and heading.	7,300	Lumber, flour, staves, heading, and wood.	12,200
Fish	2,150		
Total	9,450	Total	12,200

Total tons of freight	29,484
The aggregate tonnage of vessels given in last annual report was	7,775
The aggregate tonnage of vessels June, 1893, was	6,121

Draft of largest vessels using harbor, 9 to 12 feet.

Largest vessels can not load to full depth.

A daily steamer carried 8,000 passengers to and from Put-in Bay, Middle Bass, and North Bass islands, and this port during the year 1892; also 200 tons of grapes.

HARBOR AT SANDUSKY, OHIO.

Various improvements to this harbor were made from 1826 to 1879, at a total cost of $222,980. The channel over the bar had but 10 feet depth and the greatest depth inside was about 12 feet in 1880.

In 1880 a definite project was adopted for a channel 200 feet wide and 15 feet deep through the outer bar and by an indirect route to the city wharves, along the front of which the channel was to be 100 feet wide and 15 feet deep. This work was nearly completed in 1888, when a project was adopted for a straight channel 200 feet wide and 17 feet deep from the east end of the wharf channel to the north end of Cedar Point. The estimated cost of this project was $96,712.

The amount expended on this work to June 30, 1892, was $69,185.29. As a result, the straight channel has been so far dredged that the removal of 250,000 cubic yards will complete it entirely. A contract was let for completing the work and was to be finished on or before November 30, 1893.

The completion of the work will still leave the channel along the wharves but 100 feet wide and 15 feet deep. Reports were received that this channel has been somewhat filled.

The expenses of last fiscal year have been for a necessary survey of the straight channel and channel over the bar; the latter now has a least depth of 16 feet over a width in narrowest place of 90 feet.

It is estimated that $25,000 can be profitably expended in the improvement of this harbor during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Receipts.	Tons.	Shipments.	Tons.
Fish	2,146	Coal	157,515
Iron ore	71,000		
Lumber	155,000		

Shipping.	No.	Tonnage.
Vessels entering	3,425	708,975
Vessels departing	3,453	714,771
Total		1,423,746
Aggregate tonnage given in last Annual Report		1,523,510
Decrease		99,764

Draft of largest vessel entering the harbor, 17 feet.
Depth of water prevents largest vessels from loading to full depth.

HARBOR AT TOLEDO, OHIO.

Toledo is situated on the Maumee River, 5 miles from the bay and 8 miles from Lake Erie. It is the center of no less than 13 railroads, and since the introduction of natural gas in 1887 has been making wonderful progress as a manufacturing city, with excellent prospects for a large future increase. Toledo has a population of nearly 100,000.

Maj. Overman, in 1887, says, "The work of improvement thus far executed has been the means of a large reduction in the rates of freight and insurance, fully 50 per cent."

The original project provided for improving the old channel through Maumee Bay by dredging to a depth of 12 feet and width of 200 feet. This was amended from time to time, until the old channel had a least depth of 15.5 feet.

In 1887 a project was adopted, in compliance with previous acts of Congress, for a straight channel through Maumee Bay, 200 feet wide at the bottom and 17 feet deep, referred to the mean level of the lake. The line was so located as to utilize the old channel as far as possible.

The estimated cost of the last project was $1,875,000. The total amount appropriated and expended for old channel to June 30, 1892, was $724,332.61.

As a result the channel has been dredged as originally planned, save a single cut 25 feet wide and 2,400 feet long in outer section, and a cut of 30 feet wide and 1,300 feet long in turn-out division. The channel, however, filled so that the average depth was but 15.6 feet.

The officer in charge of the improvement recommended that but one-half of the last appropriation of $200,000 be expended in dredging the straight channel because that amount would complete the original dredging of straight channel and would redredge a part which had filled; it was also recommended that a dredge, scows, and tug be purchased and that the balance of the appropriation be used to operate the dredge, to maintain depths in the straight channel, and to extend the removal of shoal in old channel, and extending improvement up the Maumee River.

These recommendations were approved. Surveys of straight channel were made in the autumn of 1892 and spring of 1893.

A contract was awarded in December, 1892, for dredging in straight channel. Dredging was commenced early in the spring, and will be continued until the contract is completed.

The channel in turn-out section has been completed and good progress has been made elsewhere. The straight channel is regularly navigated by day, but is not well lighted, so that navigation by night is difficult. It has been found necessary to widen the outer section to 300 feet. It is proposed to expend the next appropriation in widening the channel in outer section, in maintaining depth throughout, and in strengthening pile protection in turn-out.

It is estimated that $1,200,000 will be required to complete the existing project, and that $300,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The following statistics for the year 1892, relative to the commerce of the harbor at Toledo, Ohio, were compiled from information furnished by the collector of customs and others:

Receipts.	Tons.	Shipments	Tons.
Coal	121,975	Coal	462,268
Iron ore	146,166	Timber	776
Shingles	318	Flour	30,893
Laths	3,243	Wheat	491,556
Lumber	331,700	Corn	104,092
Logs	56,718	Rye	5,320
Lime and cement	1,073	Oats	150
Salt	7,755		
Total	668,948	Total	1,095,055

Shipping.	Number.	Tonnage.
Vessels entering	2,507	987,284
Vessels departing	2,534	992,142
Vessels built	8	3,553.09

Total tonnage for 1892	1,979,426
Total tonnage given in last Annual Report	1,954,120
Increase	25,306

Draft of largest vessel using harbor, 21 feet.
Largest vessels do not load to full depth.

HARBOR AT CONNEAUT, OHIO.

Conneaut Harbor, Ohio, is situated at the mouth of Conneaut Creek, about 30 miles west of Erie, Pa., and 13 miles east of Ashtabula, Ohio. The creek empties into Lake Erie near the boundary line between the States of Pennsylvania and Ohio, and, although a narrow stream, presents a depth of 15 feet after passing inside the piers.

Improvements were made to this harbor between 1829 and 1875 by constructing parallel piers about 100 feet apart and dredging. The channel previously had a depth of only 2 feet. The result of the improvements was a depth of 8 to 9 feet ordinarily, with a maximum depth of 11 feet in a few instances.

The works were allowed to go to decay and ruin, so that when the present project was adopted the depth over bar at mouth of river was less than 3 feet.

The present project provides for parallel piers 200 feet apart to a depth of 17 feet in the lake and for the necessary dredging to secure 17 feet depth of water.

A contract was closed for the construction of part of west pier, commencing at outer end of old pier and extending into the lake 320 feet or more, to be completed by November 30, 1893.

The expenditures during the last fiscal year were $692.91, which were for survey, examinations of bottom by borings and dredging, and for advertising and other contingent items.

The amount of previous expenditures is $106,629.39.

The harbor has been considerably improved by the Pittsburg, Shenango and Lake Erie Railroad Company. The company has dredged the channel and repaired the old piers under authority from the Secretary of War, upon conditions that the United States shall not reimburse the expense. As a result of the work done by the railroad company, considerable iron and coal have been received and shipped at the harbor.

It is estimated that $460,000 will be required to complete the existing project and that $200,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

	Tons.
Receipts: Lumber	125
Shipments: Ore	1,500

HARBOR AT VERMILLION, OHIO.

Vermillion Harbor is located at the mouth of the Vermillion River about 20 miles east of Sandusky.

In 1836 there was less than 2 feet of water over the bar at the mouth of the river, and a project was adopted to extend parallel piers, 125 feet apart, over the bar into the lake. This was amended from time to time until the piers were extended to a depth of 12 feet in the lake in the spring of 1874. The east pier was then 1,075 feet and the west pier 1,125 feet in length. In the same year a project was adopted to remove rock and other material between the piers and into the lake to afford a depth of 14 feet over a width of 100 feet. This was completed in 1879.

Since that time the channel has varied, but is rarely less than 12 feet. The piers have been repaired from time to time.

The amount expended to June 30, 1892, was $124,701.28; amount expended in last fiscal year, $4,000.

The expenditures of the last fiscal year have been for repairing the superstructure of piers. Three hundred and seventeen linear feet of superstructure on east pier at outer end has been rebuilt entirely, and other parts of both piers have been repaired.

Five hundred and two linear feet of the outer end of east pier is now in good condition. The Chief of Engineers submits that "72 linear feet of inner end is in fair condition; the remainder is in very bad condition and should be renewed. The deck of west pier is in fair condition, but the timber above water is rotten and the superstructure should be rebuilt."

It is estimated that $6,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The following statistics for the year 1892, relative to the harbor at Vermillion, Ohio, were compiled from information furnished by the collector of customs and others:

Receipts.	Tons.	Shipments.	Tons.
Lumber	2,250	Oak lumber	2,000
Fresh fish	500	Gravel	300
		Fresh and salt fish	300
Total	2,750	Total	2,600

Shipping.	No.	Tonnage.
Vessels entering	40	
Vessels departing	39	
Tugs rebuilt	2	40

Draft of largest vessels using harbor, 14 feet.
Largest vessels do not load to full depth.

OUTER HARBOR AT MICHIGAN CITY, IND.

Michigan City is situated on the south shore of Lake Michigan, about 38 miles southeast of Chicago. It has a population of about 8,000.

Improvements at this point have had a decidedly favorable effect upon commerce, as the following figures indicate. It is estimated that every dollar expended has been more than returned in the increased business prosperity of this section and in the reduced rates of transportation.

Entrances and clearances.

Years.	Number.	Revenue collected.	Tonnage.	Years.	Number.	Revenue collected.	Tonnage.
Fiscal year—				Calendar year—			
1885	1,334	$116.35		1888	1,153		208,617
1886	966	90.10		1889	795		169,193
1887	1,099		213,685	1890	921		172,817
1888	1,167		213,074	1891	837		168,654
				1892	1,391		443,055

Two daily lines of passenger and freight steamers were established in 1892 between this port and Chicago.

Since 1878 the size of vessels generally employed in lake carriage has greatly increased. At Michigan City Harbor, in 1872, the date when improvements were commenced, the receipts were less than one-fifth of those in 1882, and since that time no depreciation has taken place.

Improvements at this point were first undertaken by the Government in 1836. The first project, adopted in 1870, was designed to provide a harbor of refuge suitable for all classes of vessels engaged in commerce on the lake, to be secured in the customary manner by the extension of two piers into the lake from the inner harbor entrance.

The older works are much decayed, and the basin has never been dredged. It is not used by vessels.

In connection with the outer harbor, a pier projects 500 feet northward from the west end of the breakwater to protect the entrance from a strong westerly current.

The "outer breakwater," projected in 1882, is now under construction. The work lies in the open lake westward of the entrance and is to have a length of 2,000 feet, the two equal arms making an angle of 135°. It is probable that some modifications of the plan and position of this work are desirable. Five hundred feet of it, starting from the east end, which is 400 feet distant from the end of the projecting breakwater pier, was built in 1889, and 200 feet more is now under contract.

The gross expenditure to account of the outer harbor to July 1, 1892, including the outer breakwater, was $706,588.05.

For the outer harbor the expenditures for the fiscal year were $6,830.41. The repairs to the west end of the old breakwater, begun in May, 1892, were completed in September, and the two outer cribs of the breakwater pier were refilled with stone and planked over.

On the outer breakwater some of the decking, broken by the heavy sea of the fall gales, was replaced.

It is estimated that $249,613.50 will be required to complete the existing project, and that $80,000 can be profitably expended during ensuing fiscal year. It is proposed to apply the next appropriation to the continuation of the construction of outer breakwater 500 feet, with contingencies.

INNER HARBOR AT MICHIGAN CITY, IND.

Trail Creek is a small stream winding through the city and discharging at the head of Lake Michigan. The original proposition here, as at other places similarly conditioned, was to deepen the bed and revet the banks of the creek within the shore line, and to protect the entrance by means of parallel piers projecting into the lake. This project has long since been carried out and has satisfactorily answered its purpose, although annual expenditures for dredging and repairs are necessary, and an inward extension of the improvement to unoccupied territory back of the city, later authorized, has not yet been completed. The local authorities and riparian owners attend to the revetting and maintenance of the banks, while the United States looks after the channel dredging and the repair and maintenance of the piers.

The original proposed depth of 12 feet has been increased to 13 feet, to conform with the greater draft of lake vessels, and the deposits brought down by freshets in the creek and by sewers, and driven in by the sea from outside the entrance piers, have from time to time to be removed.

For the inner harbor, the expenditures for the fiscal year were $9,495.92. At the beginning of the year the navigation was in good condition and work continued on the inward extension, the area dredged being 1,430 feet long by from 50 to 100 feet wide, to a depth of 15 feet, and the amount handled 62,280 cubic yards. Soundings December 1, 1892, showed 18 feet at the entrance, 14 feet to the Franklin Street Bridge, and thence 12 and 13 feet to the upper end. In April, 1893, the entrance had shoaled to 11 and 12 feet, and a cut 75 feet wide by 16 feet deep was made for a distance of 625 feet. With additional dredging near the Michigan Central Railway Bridge, the total amount was 8,087 cubic yards. This left the navigation in good condition, and the dredge cleaned out the lower winding basin at the expense of the city, the filling being due to silt from a sewer.

Aside from the dredging, the principal matter requiring attention is the old pier at the east side of the entrance. The outer 700 feet of this is rapidly rotting down and the end has dissappeared under water.

It is a danger to vessels, and is needed to protect the entrance from the large accumulations of sand in the adjacent "outer harbor," and should be rebuilt to a height of about 4 feet above water.

The working balance on hand will be used for further dredging.

As the inner harbor is separately appropriated for, the estimate for 1895 is as follows: Rebuilding east pier $8,000; refilling and minor repairs to west pier, $2,000; dredging for the maintenance of navigation, $4,000, which, with contingencies, makes $18,000.

HARBOR AT CALUMET, ILL.

This improvement is to furnish a safe and practicable entrance to Calumet River and the port of South Chicago by parallel piers 300 feet apart, extending from shore to deep water in the lake, and by dredging between them to 16 feet in depth at low water.

The work commenced in 1870, and at the close of the fiscal year ending June 30, 1893, there had been expended $437,007.06, as the result of which 3,640 linear feet of the north pier and 2,020 linear feet of the south pier have been completed, and 471,364 cubic yards of material dredged, giving a channel 16 feet in depth instead of 7 feet, as originally existed.

The channel is now 250 feet in width, 16 feet in depth below extreme low water in Lake Michigan, and extends from a similar depth in Lake Michigan to the beginning of the 16-foot channel in the Calumet River.

During the fiscal year ending June 30, 1893, a contract was entered into for rebuilding superstructure over 1,600 linear feet of pier work, and for 320 linear feet of sheet piling. All of this work has been completed during the past fiscal year, excepting the sheet piling; 303,512 feet, B. M., pine timber, and 36,748 pounds iron driftbolts were placed in the work; 51 piles were driven and capped with oak timbers.

The Chief of Engineers submits:

> One thousand eight hundred and thirty-seven linear feet of superstructure over the piers is in need of repair, a large part of which is in a deplorable state of decay.
>
> The south pier should be prolonged 800 feet, but until existing work is put in thorough repair it is not advisable to further extend the work.

The requirements of the project have been complied with, and the Chief of Engineers estimates that $25,000 can be profitably be expended during the ensuing fiscal year in the maintenance and repair of the works.

The effect of the operations already concluded is noticeable in the increase of the lumber and general commerce of the port; several iron-manufacturing plants are located in South Chicago, near Calumet Harbor, and other industries are rapidly developing in this section of the city.

COMMERCIAL STATISTICS.

Arrivals and clearances of vessels.

	Entered.		Cleared.	
	No.	*Tons.*	*No.*	*Tons.*
Steam	517	355,121	479	597,606
Sail	255	116,659	249	108,473
Total	772	771,780	728	706,079

Receipts and shipments by lake during the calendar year 1892.

Receipts.	Tons.	Shipments.	Tons.
Coal	123,000	Grain	82,411
Iron and iron ore	1,334,433	Coal	500
Cement and plaster	19,041	Iron	100
Salt	79,906	Steel rails	5,400
Lumber	128,116		
Miscellaneous	50,000	Total	88,411
Total	1,734,496		

HARBOR AT CHICAGO, ILL.

The present project was adopted in 1870, and contemplated—

a. The formation of an outer harbor or basin, by inclosing a portion of Lake Michigan just south of and adjoining the entrance to Chicago River, for the purpose ot increasing the harbor facilities of Chicago.

b. The construction of an exterior breakwater in deep water north of the entrance to Chicago River and about 1 mile distant, to shelter the approach to the river and outer harbor entrance, and to form a harbor of refuge at the southern end of Lake Michigan.

There has been expended upon this project since 1870 $1,722,158.13, which expenditure has resulted in the completion of the outer harbor, except 267,000 cubic yards of dredging still remaining to be done to attain 16 feet depth of water at low water throughout the required basin; in the completion of the exterior breakwater, 5,413 feet in length; in keeping the entrance to Chicago River, which constitutes the inner harbor of Chicago, dredged; in maintaining the various piers and breakwaters, and in maintaining in serviceable condition the plant pertaining to the work.

During the fiscal year ending June 30, 1893, the work consisted in—

a. Exterior breakwater.—No work was done upon this construction, it having been completed.

b. Outer basin and south pier, Chicago Harbor.—Contracts were entered into for rebuilding superstructures over 3,725 linear feet of pier work October 28, 1892, and during the fiscal year 179,428 feet, B. M., pine timber and 20,700 pounds drift bolts have been secured in the work over the southerly breakwater outer basin. The work is in progress under contract named, that expires December 1, 1893.

Dredging entrance to Chicago River.—The entrance to Chicago River has been dredged to a depth of 20 feet, and 34,056 cubic yards of the material dredged paid for under contract. This depth exceeds by 4 feet the stipulated depth; the excess was not paid for.

By the end of the next fiscal year the superstructures over the piers of the outer basin and along the entrance to Chicago River will have been renewed, and there is now in need of repair 3,240 linear feet of superstructure over the exterior breakwater built in 1881–1883. The estimate submitted is for this work of maintenance only; the superstructure to be built of timber, crib work, and stone, that method being as yet more economical than permanent work of stone or concrete, estimating money at 4 per cent interest per annum and the lifetime of timber at 12 years.

There is also a large amount of dredging to be done in the outer harbor, estimated at 267,000 cubic yards, to give 16 feet of water beyond the dock lines. This work is not pressing and should await

the settlement of the question as to the disposition of that part of the area inclosed by the United States piers shoreward of the dock line.

The outer basin has never fulfilled the purposes of its construction, except partially during the latter part of the fiscal year, when it has been in use for the purposes of the World's Columbian Exposition, and the expenditures of the Government thereon should await and be based upon its use and value for the public.

COMMERCIAL STATISTICS.

Amount of revenue collected at nearest port of entry (Chicago) during fiscal year, $8,510,318.50.

Arrivals and clearances of vessels during the year, port of Chicago.

	Arrived.		Cleared.	
	No.	*Tons.*	*No.*	*Tons.*
Steam	5,134	3,653,997	5,250	3,832,725
Sail	3,554	1,100,177	3,583	1,113,441
Total	8,688	4,754,174	8,833	4,946,166

Receipts and shipments by lake during calendar year 1892.

Receipts.	Tons.	Shipments.	Tons.
Coal	1,363,862	Flour	245,784
Iron and iron ore	137,286	Grain	2,377,118
Stone	14,465	Lard	29,128
Sulphur	125	Meats	4,044
Lumber and wood	2,947,280	Lead	72,034
Flour, salt, sugar, and sirup	212,216	Oil and oil cake	45,018
Cement and plaster	82,773	Hay	1,758
Potatoes	9,207	Iron	8,205
Coffee and tea	1,800	Sugar and sirup	15,301
Fish	4,552	Seed	163,340
Grain	2,522	Coal	4,467
Miscellaneous merchandise	500,000	Miscellaneous merchandise	170,707
Total	5,276,088	Total	3,136,904

HARBOR AT WAUKEGAN, ILL.

The city of Waukegan, situated on this harbor, has a population of about 5,000. It is located about 35 miles north of Chicago, and is the only harbor between that point and Kenosha, a distance of 52 miles.

Previous to the improvement there was no navigable channel or natural harbor at this place, the adopted project contemplating the construction of an artificial harbor.

A project was adopted in 1852 which provided for the construction of a breakwater parallel to the shore in 20 feet of water. One crib was placed in position, but was carried away by a storm.

The present project was adopted in 1880, and provides for the construction of an exterior basin of sufficient capacity for local trade by inclosing a portion of Lake Michigan with pile piers, the entrance channel between the piers and the inclosed area to be dredged to 12 feet.

There has been expended on this harber up to the close of the fiscal year ending June 30, 1892, $137,500.27, resulting in the construction of 2,878.5 feet of pile pier and the removal of 90,588.6 cubic yards of material.

During the fiscal year ending June 30, 1893, $10,654.93 was expended in removing 50,292 cubic yards of material from the entrance channel and basin.

Under contract the work of constructing 376 linear feet of pile pier in the extension of the present piers was favorably progressing at the close of the engineer's report, and was to have been completed October 31, 1893.

Soundings taken in April, 1893, showed the governing depth in the entrance channel to be about 10½ feet.

It is estimated that $61,000 will be required to complete the existing project which amount can be profitably expended during the ensuing fiscal year.

The exports of the harbor for the calendar year ending December 31, 1892, amounted to 14,855 tons, and imports amounted to 358,969 tons, handled by all ways of transportation.

HARBOR AT CHARLEVOIX AND ENTRANCE TO PINE LAKE, MICHIGAN.

The harbor of Charlevoix is situated at the mouth of Pine River, which empties into Lake Michigan about midway between Great and Little Traverse bays, and gives access to Pine Lake, a large and navigable body of water extending some 15 miles into the interior. The original entrance depth, due to the outflow from these lakes, was from 2 to 6 feet. The project of 1868, revised in 1876, calls for 12 feet between piers 100 to 150 feet apart at the Lake Michigan entrance, and the revetment of a passage 83 feet in width between Round and Pine lakes.

The expenditures to July 1, 1892, were $99,944.24. The piers are not yet fully extended, and the navigation is irregularly maintained by dredging at from 10 to 11 feet. The conditions last spring were unusually good, due to the rise in the lake level, not less than 13 feet of water showing in the channel axis.

The Chief of Engineers submits: "The south pier needs completion by the addition of 100 feet, and much of the older work should be repaired."

The expenditures for the fiscal year were $2,123.67.

Both the channels were dredged in July, 1892, the lower 70 feet wide and 16 feet deep and the upper 40 feet wide and 13 feet deep. The material dredged measured 14,105 cubic yards, which was dumped in the outer lake.

It was proposed to expend the balance available up to July, 1893, for urgent repairs and for dredging the channel as required.

It is estimated that $73,500 will be required to complete the existing project.

The following work, with estimated expenditures therefor, is recommended by the Chief of Engineers for the ensuing fiscal year:

For 100 linear feet of south pier, to complete the project, $9,500; rebuilding 500 feet of old north pier and sheet piling and strengthening the revetments and dredging, $28,500, making with contingencies, $42,000.

COMMERCIAL STATISTICS.

Entrances and clearances.

Years.	Number.	Revenue collected.	Tonnage.	Years.	Number.	Revenue collected.	Tonnage.
Fiscal year—				Calendar year—			
1884	772	$355.46	.....	1888	526	.....	92,306
1885	599	779.53	.....	1889	473	.....	.....
1886	674	390.46	.....	1890	532	.....	75,224
1887	753	.....	151,360	1891	534	.....	79,613
				1892	537	.....	79,966

HARBOR AT FRANKFORT, MICH.

The harbor of Frankfort is located about 35 miles southwest of Traverse City, Mich. The town situated on the harbor has a population of about 1,000. Several sawmills and furnaces are located here, and the lumber business is being rapidly developed.

The advantages of the harbor are of considerable value as affording shelter to vessels in storms and gales which frequent this coast.

Lake Aux Becs Scies formerly discharged into Lake Michigan through a channel of 3 or 4 feet, and the project of 1866, revised in 1869 and 1879, called for an entrance depth of 12 feet and width of 200 feet.

The project is not yet completed, and by annual dredging from 9 to 11 feet is provided. The north pier lacks 300 feet of completion, and the south pier 100 feet, and provision is needed for this, especially in view of the fact that the Toledo, Ann Arbor and North Michigan Railway, having a terminal at Frankfort, has undertaken a costly and interesting experiment in ferrying freight trains across the lake to Kewaunee, a distance of 62 miles. The two transfer boats, specially built for the purpose, were put in service in midwinter, and thereafter made regular trips, establishing the feasibility of the undertaking.

In September, 1892, dredging began at Frankfort, under contract, and was continued until November 30. The quantity removed was 37,106 cubic yards, making a cut 100 feet wide and 16 feet deep.

In April, 1893, the depth was still sufficient for navigation, and the contract was closed. Soundings in June showed a navigable depth of 16 feet, indicating an unusual and unexpected tendency to continuance, but further dredging will no doubt be called for during the season.

The total expenditures to July 1, 1892, were $263,511.86, and for the fiscal year $6,595.36.

It is recommended by the Chief of Engineers that the following expenditures can be profitably made during the ensuing fiscal year:

To complete the piers, according to present project, $40,500; for sheet piling, repairs, and dredging, $5,000, which with contingencies makes $50,000.

Entrances and clearances.

Years.	Number.	Revenue collected.	Tonnage.	Years.	Number.	Revenue collected.	Tonnage.
Fiscal year:				Calendar year:			
1884	488	$404.70	.....	1888	1,342	.....	216,376
1885	261	75.66	.....	1889*	.....	.....	.....
1886	.....	.....	.....	1890	443	.....	27,140
1887	.....	.....	.....	1891	1,541	.....	258,908
1888	.....	.....	.....	1892	910	.....	167,777

*Not stated.

HARBOR AT GRAND HAVEN, MICH.

Grand Haven, lying at the mouth of Grand River, in addition to its local commerce as the terminal of the Detroit, Grand Haven and Milwaukee Railway, with which a line of translake steamers connects, is the principal harbor of refuge on the coast, and with that object was designed with an entrance width of 400 feet and depth of 18 feet.

The mouth of the river was originally improved by the construction of a railway pier on the south side, and the work was taken in hand in 1866 with extensions authorized in 1880 and 1890.

Two great piers have been built, which, with the shore revetments, are respectively 3,187 and 5,576 feet in length. The outer ends of the piers are abreast each other, a position which, at Grand Haven, experience has shown to be most advantageous to the navigation. The works have secured very beneficial results.

The Chief of Engineers says:

> There are still two matters of importance to be attended to. One, the extension of the piers to their full length, of which 150 feet on the north and 100 feet on the south side are still lacking. The other is the control of the flying sand from the enormous dunes on the north side of the entrance, from which immense quantities of sand are annually blown into the river and, being carried by the current, tend to maintain a bar directly opposite the middle of the entrance and outside the piers.
>
> These dunes were originally covered with forest, but this was cut down and the surface left naked to dry and move with the wind. The work of regulating them by inducing natural growth of suitable vegetation is one requiring time and should not be deferred, as unless it is done the bar formation will continue, no matter to what length the piers extend.
>
> It may be noted that this sand movement constitutes a vicious circle. The sands carried to the lake are then distributed and in part driven to the beach by wave and wind action, thence they climb the dunes, and, overlapping them, descend the slope to the river to be again transported to the lake. With vegetation on the dunes this circulation would cease.

The total expenditures to July 1, 1892, were $604,240.82, and for the fiscal year $33,959.38.

The navigation has been fairly satisfactory throughout the year, although in March, 1893, a prolonged flood in the river carried down a vast amount of sand, which reduced the entrance depth to less than 15 feet. By the end of March the sand wave had rolled out and the navigation improved. By June 13 there was again 17 feet at the entrance, with 15.9 feet on the bar outside.

The same spring flood seriously endangered a large portion of the curved revetment on the south side of the river, which regulates the movement along the bend in the river inside the piers. The bottom was deeply scoured, leaving much of the front piling without support in the bottom, making necessary immediate measures to secure it. Arrangements had already been made for extensive repairs to the work, and these are still in hand.

The new 100 by 30 foot crib under contract was completed September, 1892, and in December further contract was made for 350 feet of north pier and 200 feet of the south pier. Work began in May, but progress has been slow.

In addition to completing the pier, extensive repairs to the old work are required.

It is estimated that there can be profitably expended during the ensuing fiscal year $115,000, specified as follows:

> To complete both piers, $35,000; to extend the north revetment upstream, $15,000; for rebuilding, repairing, refilling, etc., old work, $42,000; for dredging, sand fencing, and shrub planting, $12,000; total, with contingencies, $115.000.

COMMERCIAL STATISTICS.

Entrances and clearances.

Year.	Number.	Revenue collected.	Tonnage.	Year.	Number.	Revenue collected.	Tonnage.
Fiscal year:				Calendar year:			
1884	2,331	$5,221.81	.....	1888	1,508	.....	1,405,600
1885	1,634	1,985.43	.....	1889	1,110	.....	649,370
1886	1,384	1,546.32	.....	1890	1,172	.....	834,089
1887	1,297	.....	632,159	1891	819	.....	616,422
1888	1,888	.....	1,036,629	1892	815	.....	693,835

HARBOR OF REFUGE AT GRAND MARAIS, MICH.

The necessity of a harbor of refuge on the American shore of Lake Superior, at some point between White Fish Bay and Grand Island, a distance of 85 miles, was recognized by navigators long before the commerce of the lake had assumed the importance it now possesses.

Grand Marais, from its situation about midway between these points, and from its natural topographical advantages, seemed to be the most desirable place for the construction of a refuge of the character desired, and was accordingly selected. The many wrecks which still continue to line the rocky coast in the immediate vicinity of this bay are mute witnesses to the violence of prevailing storms, the necessity for the establishment of the harbor, and the urgency for the completion of the same.

Vast lumbering interests lie contiguous to this harbor, which would make it a shipping point in the event of there being a sufficient depth of water in the channel to accommodate the vessels engaged in such business, and it is highly probable that it would not be long after obtaining a navigable channel into it before the harbor would claim other distinctions than that of a harbor of refuge. A railroad is being built toward this harbor and will be completed soon.

Originally the entrance to this harbor was obstructed by a bar having but about 6 feet depth of water upon it. The project for its improvement, adopted in 1881, has for its object a deep and safe channel into the harbor, making it a harbor of refuge. This object is to be attained by building parallel piers projecting into the lake and dredging out a channel between them, connecting the deep water of the lake with that of the harbor.

The proposed length of each pier was 1,800 feet. The west pier has now reached a depth of 1,406 feet and the east pier 853 feet.

A channel 150 feet wide and 17 feet deep was dredged out between the piers in 1889, but it shoaled, and in 1891 it was again dredged, this time to a width of 175 feet and a least depth of over 17 feet, the outer ends of canal piers repaired, new shore ends and spurs put in, and the old shore ends remodeled. A partial survey in June, 1893, shows a shoaling to 14 feet. Under existing contract, to be completed October 15, 1893, the east pier will be extended 300 feet and have a total length of 1,153 feet, including 100 feet of pile dike.

The total amount expended under approved project to June 30, 1892, was $226,608.06.

The amount expended during the year ending June 30, 1893, was $966.87.

It is estimated that $188,750 will be required to complete the existing project and that $100,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and clearances of vessels at Grand Marais, Mich.

Vessels.	Arrivals.	Clearances.
Steamers	155	155

Principal articles of export and import.

	Tons.
Exports.	
Fish	1,930
Imports.	
Coal	100
General merchandise	2,990
Total	5,020

Receipts and shipments for six years.

	Tons.		Tons.
1887	1,910	1890	9,405
1888	6,270	1891	1,356
1889	8,686	1892	5,020

HARBOR AT MANISTEE, MICH.

The commerce of Manistee is large and is maintained throughout the year, the Flint and Pere Marquette Railway Company having a terminal here, and the salt and lumber shipments are heavy.

Manistee River enters the lake of same name and thence flows to Lake Michigan, about 8,000 feet distant.

As originally deepened by lumber industries, the entrance had 7 or 8 feet of water. The project of 1867, revised in 1871, 1873, and 1875, called for 12 feet between piers 180 feet apart. As again revised in 1890, the depth was to be increased to 15 feet and the improvement to extend through the river from lake to lake, the natural depth being from 10 to 11 feet only. The work was done in 1891, but in May, 1892, the river channel had shoaled to 13 feet, owing to the narrowness of the stream, the unprotected state of the banks, and the large number of vessels passing. The act of July 13, 1892, took cognizance of this and provided that further dredging in the river should be contingent on proper bank protection.

The entrance piers have a length of 1,251 feet and 1,129 feet respectively, with 350 feet of extension required for each. Much of the older work is in need of repair.

The total expenditures to July, 1892, were $222,669.31, and for the fiscal year $9,440.84. The outer north cribs, needing ballast, were refilled and riprapped. Contract was made December, 1892, for 350 feet of pier on the north side to complete it. The work is in progress and will be completed this season, the first crib having been sunk June 23.

In May, 1893, repairs were begun on the portions of older work most in need of them, and continued to the end of the year.

The navigation was fairly good during 1892, but in the spring of 1893 further dredging was required, which was done in May and June, making a cut 60 feet wide and 18 feet deep for a distance of 980 feet. Between the piers a 13-foot shoal was deepened to 18 feet with a width of 80 feet. The total amount dredged was 24,970 cubic yards.

The south pier should be completed by building an additional 350 feet and the repairs continued.

It is estimated that $61,000 can be profitably expended improving this harbor during the ensuing fiscal year. The Chief of Engineers specifies as follows:

To complete the south pier, $42,000; for repairs and sheet piling, $9,300, and for dredging, $4,000; total, with contingencies, $61,000.

COMMERCIAL STATISTICS.

Entrances and clearances.

Years.	Number.	Revenue collected.	Tonnage.	Years.	Number.	Revenue collected.	Tonnage
Fiscal year:				Calendar year:			
1884	3,609	$3 181.19	.....	1888	3,595	.....	966,221
1885	3,560	1,145.29	.....	1889	3,524	.....	945,329
1886	3,352	634.26	.....	1890	3,691	.....	975,049
1887	3,412	.....	991,872	1891	3,617	.....	1,079,818
1888	3,459	.....	889,879	1892	4,044	.....	1,028,629

HARBOR AT HOLLAND (BLACK LAKE), MICH.

This harbor is located on the east shore of Lake Michigan, about 5 miles southeast of Muskegon, at the city of Holland.

The outlet from Holland Lake was originally improved to about 5 feet at local expense, and the project of 1866, amended in 1873, 1879, and 1884, calls for a 12-foot channel between piers and revetments 200 feet apart.

To secure this depth the piers have insufficient development, and frequent dredging is resorted to to keep the harbor open.

The piers are respectively 713 and 696 feet long, terminating at about the 10-foot contour in the lake, while the 15-foot contour is about 500 feet farther out, and the commercial interests of the harbor are hampered by insufficiency of depth.

August, 1892, the draft was 9 feet, September 8½ feet, and November 6½ feet. In April, 1893, soundings showed but 7 feet between the piers, notwithstanding the rise in the lake.

The entrance was dredged in April and June, 1893, and a cut 50 feet wide and 1,440 feet long made to 18 feet. The total dredged was 15,587 cubic yards, and by July 1 the navigable depth throughout was 13 feet, which, however, can not be maintained.

The total expenditures to July 1, 1892, were $272,242.87, and for the fiscal year $2,377.20.

It is estimated that $15,000 can be profitably expended improving this harbor during the ensuing fiscal year.

COMMERCIAL STATISTICS, HOLLAND (BLACK LAKE), MICH.

Entrances and clearances.

Year.	Number.	Tonnage.
Calendar year:		
1891	2,676	178,300
1892	2,800	200,000

Receipts and shipments by vessel, 1892.

Articles received .....tons.. 201,606 || Articles shipped .....tons.. 105,874

HARBOR AT MONROE, MICH.

The harbor of Monroe, Mich., is situated at the extreme westerly end of Lake Erie, about 1½ miles west of the old mouth of the Raisin River, and about 3½ miles from the town af Monroe.

Improvements were commenced in 1835 upon a plan to cut a canal through the low marshy point which separated the river from the lake. The canal is 4,000 feet long, 100 feet wide, and was dredged to a depth of 10 feet. The sides of the canal are protected by a sheet piling supported by ordinary piles and waling pieces. The mouth of the river at entrance to canal is protected by piers extending into the lake.

A project for repairs of piers and canal revetment was adopted in 1886, the cost then being estimated at $20,000. In 1891 the estimate was amended to $26,000.

The total amount expended upon the improvement from 1836 to June 30, 1892, was $225,515.27.

The channel in general has a depth of not less than 9 feet to the wharves at Monroe and is in good condion. The revetment and piers are badly decayed, and storms in the spring of 1893 tore away considerable of the superstructure of the north pier.

The appropriation of $10,000 made by act of July 13, 1892, will be expended in making necessary repairs to north pier.

The work of repair was commenced early in June by hired labor and purchase of materials in open market, that being the most advantageous and economical method for the United States.

It is estimated that $16,000 will be required to complete this project for repairs to the existing works, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Receipts.	Tons.	Shipments.	Tons.
Telegraph poles	9,750	Railroad ties	20
Pig iron	20	Fresh fish	20
Car stakes	100		
Total	9,870	Total	40

Shipping.	No.
Vessels entering	301
Vessels departing	301

Total tonnage for 1892, 14,926 tons.
Tonnage given in last annual report, 20,000 tons.
The draft of the largest vessel using harbor is 10 feet.
The depth of water in the harbor prevents the largest vessels from loading to full depth.
New lines of transportation established during the year: Two lines of steamers plying between this port and Toledo, Ohio.
Estimated number of passengers carried during season, 15,000.
From 15,000 to 20,000 telegraph poles and between 50,000 and 100,000 posts, paving sticks, and railroad ties were received in crib rafts, of which no account of tonnage was taken.

HARBOR AT MUSKEGON, MICH.

Muskegon is the largest of the interior lakes which are scattered along the east shore of Lake Michigan. The river of the same name discharges through it, and the city of Muskegon, with a population of

over 30,000, is built on its shores. With these advantages, three lines of railway, and numerous steamers, the harbor is an important one and its commerce large.

The entrance was originally deepened, at private cost, to about 7 feet. The project of 1866, amended in 1869, 1873, 1881, and 1884, called for a 13-foot channel with an entrance width of 300 feet. The revision of 1890 was to close a gap in the north pier and that of 1892 to deepen the navigation to 15 feet, through from lake to lake, and extend both piers 800 feet.

The Chief of Engineers says:

With the increasing draft of lake vessels, the necessity becomes the greater to maintain a safe navigable depth at the entrances to all the important harbors if the needs of commerce are to be met.

For this purpose the piers must reach a depth in the lake greater than that to be maintained between them, the banks of the channel inside the piers should be revetted to prevent inflow of sand to the channel, and from time to time dredging is necessary to remove shoals due to drift from the lake shores and bed.

The total expenditures to July 1, 1892, were $317,796.53.

The piers are respectively 1,544 and 1,180 feet in length and need 800 feet to complete them, of which 250 and 300 feet are now under contract, leaving 550 and 500 feet to be appropriated for.

The expenditures for the fiscal year were $15,567.17.

The navigation has been fairly maintained, but at the end of April, 1896, there was only 11.8 feet near the entrance, and dredging was imperative. The United States plant being engaged elsewhere, a contractor's dredge was employed, and by June 30 had removed 13,855 cubic yards, making a cut 1,000 feet long, 75 feet wide, to a depth of 18 feet.

Repairs to the revetments were made October to December, 1892, which work is recommended to be continued.

During June, 1893, three of the contract cribs were sunk in place, two on the north and one on the south pier, leaving three more to be placed.

It is proposed to apply future appropriations to extending the piers.

It is estimated that $154,000 can be profitably expended in improving this harbor during the ensuing fiscal year. The engineer specifies as follows:

To complete the project, $126,000; and for stone filling, sheet piling, repairs, and dredging, $13,520, which with contingencies makes $154,000.

COMMERCIAL STATISTICS.

Entrances and clearances.

Years.	Number.	Revenue collected.	Tonnage.	Years.	Number.	Revenue collected.	Tonnage.
Fiscal year:				Calendar year:			
1884	7,160	$4,987.06	.....	1888	2,685	.....	.....
1885	6,112	1,621.34	.....	1889	4,626	.....	884,869
1886	5,543	1,025.17	.....	1890	3,786	.....	649,540
1887	1,745	.....	232,007	1891	2,886	.....	704,046
				1892	4,174	.....	740,021

HARBOR AT ONTONAGON, MICH.

This harbor is situated at the mouth of the Ontonagon River, on Lake Superior, and derives its chief importance from the fact that it affords the only available refuge for vessels in stress of weather along

the south shore of the lake between Apostle Islands and Keweenaw Point, a distance of 120 miles. It is also a port for a large back country and has considerable local commerce.

The entrance to Ontonagon River, which forms the harbor, had but 7 feet depth in 1867, at which time the project for securing 12 feet depth by building parallel piers on either side of the mouth, extending to the 18-foot curve of depth in Lake Superior, and dredging a channel between the piers was adopted.

The west pier has reached a length of 2,675 feet, and is very nearly out to the 18-foot curve of depth, as proposed. But this curve has advanced in the meantime, owing to the very considerable volume of sand carried into the lake by the river, and since it appears probable that the advance of the bar will keep pace with the extension of the piers, unless a very considerable extension is made at once, it does not appear that economic considerations would justify any further extension of the piers at present. The east pier is 2,315 feet in length.

For a time it seems that better results will be secured after the piers are put in repair and the superstructures to outer cribs of west pier are finished by dredging across the bar after each spring freshet. The channel between the piers has kept a depth of over 12 feet, A dredged channel through the bar and the remaining 150 feet of superstructure on the west pier were completed in 1891.

At the close of work in 1891 the channel was left with 16 feet of water in it, but the river has partially filled this up during last season's freshets, and an examination made in June, 1893, shows an available depth of only 13.5 feet clear through, and along the inner half of over 16 feet.

Under existing contract repairs to piers will be made during this season amounting to about $5,000. Some dredging was to be done after the spring freshets. No reports of any results have been accessible.

The amount expended during the fiscal year just closed was $1,237.14. The total cost of the improvement to June 30, 1892, was $306,643.08.

It is estimated that $33,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Year.	Arrivals.	Departures.	Aggregate tonnage.	Year.	Arrivals.	Departures.	Aggregate tonnage.
1879	89	89	104,920	1884	172	172	206,400
1880	117	117	137,960	1885	186	186	143,200
1881	136	136	160,160	1886	190	190	236,000
1882	188	188	223,580	1887	174	174	222,100
1883	198	198	230,096	1888	120	120	188,100

Statistics for 1888 are the last obtainable.

HARBOR AT PENTWATER, MICH.

Pentwater is one of the smaller of the interior lakes along the west Michigan coast, and its entrance was originally a mere drain, later improved to about 4 feet by slab piers built by private interests.

The city of Pentwater, lying on this harbor at the mouth of the Pentwater River, is the northern terminus of the Chicago and Michigan Lake Shore Railroad, and it is situated about 44 miles northwest of Muskegon. Its trade is principally in lumber, fish, and other products.

The project of 1866, amended in 1873 and 1884, calls for 12 feet depth between piers and revetments 150 feet apart. The south pier still lacks 200 feet of its projected length and should be completed, as the outer ends of the piers only reach the 10-foot contour in the lake, and the 15-foot contour is 400 feet farther out. Meanwhile the navigation is kept at about 10 feet by occasional dredging.

The total expenditure to July 1, 1892, was $231,393.89, and for the fiscal year $973.38.

In July, 1892, the channel depth had diminished to 9 feet and was restored in July and August by a cut 40 feet wide, 15 to 16 feet deep, reaching from 13 feet inside to deeper water at the ends of the piers. The material removed measured 11,674 cubic yards. By November the entrance had again shoaled to 10 feet, but this held during the winter and in May, 1893, was 11.3 feet, the lake having risen a foot or more.

Much of the older work is badly dilapidated, and especially the inner revetments which are in urgent need of repair.

The Chief of Engineers submits the following estimate for expenditures, which he recommends be made during the ensuing fiscal year:

For 200 feet of south pier to complete the project, $24,000; for rebuilding and refilling with stone 1,557 feet of old revetment, $15,570; for dredging, $3,000, making, with contingencies, $45,000.

HARBOR AT SAND BEACH, MICH.

The harbor of refuge at Sand Beach is the only place of shelter accessible to the general commerce of the lakes in the vicinity of Pointe aux Barques, Lake Huron, an exposed and stormy locality with no harbor or safe anchorage for a stretch of 80 miles along a rocky and dangerous coast.

Probably no other single work on the lakes has the peculiar relation in value to general commerce. Without local commerce it is at times thronged with vessels seeking shelter, and the statistics show the number and tonnage annually availing themselves in increasing measure of its protection, and its total cost has been inconsiderable in comparison with the advantages gained by shipping.

The harbor was projected in 1876 at an estimated cost of $1,155,000 and practically completed in 1885 at a cost of about $975,000, although much excavation is still needed within the basin. The works are built in the open lake in a curvature of the shore line and furnish shelter from north, northeast, and east, the land sheltering from west and south. From southeast the harbor is exposed in part, but in this portion the outside depth is 10 feet and less and the seas can not enter with any force. The entrances are from the north with a width of 300 feet, and from the east with a width of 600 feet.

The piers are detached and three in number, the west pier 1,500 feet long, facing about north by east, the main pier 4,672 feet long facing northeast; and the south pier 1,956 feet long facing east. The area inclosed having a depth of 12 feet and over is 300 acres, but with 15 feet only half this, and with 21 feet 90 acres only. The north entrance is seriously obstructed with foul, rocky bottom, and is therefore used hardly at all. The main entrance is freer, but has rocky shoals bordering it on the south side both in the lake and in the harbor, and the 21 feet area inside should be greatly enlarged in order that deep vessels plunging in a heavy sea should be in no danger of striking the rocky bottom.

Much of the timber work of the piers is now well advanced in age and in need of extensive repairs, for which purpose it is desirable to main-

tain an adequate working balance in hand in order that a casualty to the works should not from lack of means to amend it become a disaster.

Contract was made for dredging the rocky bottom near the entrance, to the authorized amount of $60,000, and repairs estimated to cost $20,000 have also been provided for. The dredging work began June 30 and is in progress; the general repairs will be made during the present season.

It is estimated that $80,000 can be profitably expended in improving this harbor during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Tonnage of vessels taking shelter in the harbor of refuge, Sand Beach, Mich.

Calendar year.	Steam.	Sail.	Tow.	Total.	Total number of vessels.	Average tonnage.
	Tons.	*Tons.*	*Tons.*	*Tons.*		
1877	63,966	27,699	50,954	142,619	493	289
1878	104,025	39,699	99,282	243,006	781	311
1879	133,080	45,750	100,096	278,926	921	303
1880	158,720	55,630	147,260	361,610	1,317	275
1881	144,645	55,960	127,855	328,460	1,176	279
1882	146,132	26,504	114,067	286,703	1,022	280
1883	177,122	32,713	114,091	323,926	1,139	284
1884	156,518	34,724	122,980	314,222	1,142	275
1885	196,364	29,426	151,607	377,397	1,158	325
1886	196,335	33,790	140,862	370,987	1,304	284
1887	271,327	33,689	153,087	458,103	1,447	317
1888	271,917	39,756	202,191	513,864	1,624	316
1889	289,719	37,922	165,896	493,537	1,512	326
1890	325,852	38,826	169,104	533,782	1,575	339
1891	292,917	27,076	171,067	491,060	1,341	366
1892	362,486	29,465	162,605	554,556	1,441	384
Total	3,291,125	588,629	2,193,004	6,072,758	19,393	314

HARBOR AT PORTAGE LAKE, MICH.

There is but one harbor of refuge on the eastern shore of Lake Michigan, that at Grand Haven, and another is needed in the north-middle section of the lake. Portage Lake was adopted in 1879 as a favorable location, and the project of that date, modified in 1880 and 1881, provided for an entrance depth of 18 feet and width of 370.

The appropriations made for this purpose have been so disproportionate that no practical result has been attained. The entrance is choked with sand, and the half-built piers are almost in ruins. The navigable depth is only from 7 to 9 feet.

The total expenditures to July 1, 1892, were $95,055.92, and for the fiscal year $1,558.69.

The entrance was dredged in June, 1892, to 13 feet, which gradually diminished to 8½ feet at the end of the season. June, 1893, the depth was 8.8 feet.

It is estimated that $167,000 will be required to complete the existing project, and that $125,000 can be profitably expended during the ensuing fiscal year.

HARBOR AT ST. JOSEPH, MICH.

St. Joseph is one of the more important harbors of the east shore, with three lines of railway and an extensive freight and passenger business by water, for the conduct and development of which the navigation facilities are with difficulty maintained by frequent dredging.

In its original condition the entrance had merely a variable channel of 3 to 7 feet. In 1836, owing to certain natural advantages of position

and local features, it was selected for improvement as a harbor of refuge, and the project of 1866, modified in 1874 and 1875, called for a navigable depth of 16 feet and width of 270 feet. The project has never been carried out so far as the depth is concerned, the best water attained being 15 feet, which of late years has not averaged more than 14 feet. In fact the failure to prolong the piers to an adequate depth in the lake and the formidable shoaling outside the entrance, due to accumulations against the north pier, have at times threatened to close the entrance altogether for the class of vessels using it. A special report of these conditions was made in November, 1891, with the recommendation that the north pier be extended as rapidly as practicable to the 15-foot contour in the lake, a distance of some 1,200 feet.

The present projection of the north pier beyond the shore line is 635 feet, and at the worst condition a shoal formed directly in front of the pier with only 7½ feet on it.

The total expenditures to July 1, 1892, were $272,831.29, and for the fiscal year $11,692.

During the season of 1892 extensive dredging was done inside the harbor, particularly above the railway bridge, where the spring freshets had made deposits, reducing the channel depth to 10 feet.

In the fall of the same year the depth on the outer bar was reduced to 11 feet. Dredging was begun, and at the closing of the work the depth on the bar was 16 feet, and inside not less than 13 feet. The total dredged was 65,267 cubic yards.

Late in March, 1883, it was found that a bar with but 4 feet on it blocked the canal at the mouth of the Paw Paw. This was dredged down in April, as also a shoal above and through the railway bridge, where the depth was 11 feet only. From April 1 to July 1, 1893, 23,777 cubic yards were removed, and the outer bar showed 15 feet and the interior navigation 13, except at the lower end of the wing dam, where the depth was 11.7 feet.

Repairs were made November, 1892, of a break in the channel wall of the old north pier, but this portion of the work is in bad condition and must be rebuilt.

In December, 1892, a contract was made for 350 feet extension of the north pier, and work began in April and has continued. Four cribs are partly completed and one ready to sink.

It is estimated that $111,000 can be profitably expended improving this harbor during the ensuing fiscal year.

Entrances and clearances.

Years.	Number.	Revenue collected.	Tonnage.
Fiscal year:			
1884	560	$1,096.14	.....
1885	467	361.57	.....
1886	789	248.53	.....
1887	580	.....	144,000
1888	679	.....	208,797
Calendar year 1889	966	.....	359,925

Years.	Vessels entered.		Vessels cleared.	
	No.	Tonnage.	No.	Tonnage.
1890 (including Benton Harbor)	948	131,607	946	131,395
1891 (including Benton Harbor)	742	215,334	743	215,591
1892 (including Benton Harbor)	1,726	707,285	1,727	707,785

HARBOR AT SOUTH HAVEN, MICH.

The harbor is located on the west shore of Lake Michigan at the mouth of Black River, a stream of moderate dimensions, where the original expenditure at private cost had secured 6 or 7 feet, with a width of 85 feet.

The project of 1866, modified in 1869, 1872, and 1888, called for 12 feet, with a width of 180 feet between piers, the improvement to extend half a mile upstream to the highway bridge.

The piers lack 150 and 200 feet of the projected length, and do not extend beyond the 10-foot contour in the lake, with the 15-foot contour 300 feet farther out. In consequence of this frequent drudging is necessary, both on a recurring bar outside the piers and in the river where the naked banks permit such a silt to fill the channel.

The total expenditure to July 1, 1892, was $203,872.45, and for the fiscal year $6,562.87.

In October, 1892, the bar was dredged 70 feet wide and 18 feet deep, and a cut made inside, taking out a total of 9,063 cubic yards, but by November 25 all traces of the work had disappeared and but 10 feet practicable depth remained.

In April, 1893, there was but 9 feet for a distance of 1,300 feet, but the bar had 12 feet. The dredge worked again in May, taking out 15,690 cubic yards and restoring the navigation.

Considerable repairs were made during the year, rebuilding old work, refilling, etc., and this work is still in progress.

It is estimated that $42,000 can be profitably expended improving this harbor during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Entrances and clearances.

Years.	Number.	Revenue collected.	Tonnage.	Years.	Number.	Revenue collected.	Tonnage.
Fiscal year:				Calendar year:			
1884	466	$555.72	.....	1889 (estimated)	1,080	.....	.....
1885	361	204.50	.....	1890	2,246	.....	128,880
1886	283	113.55	.....	1891	2,994	.....	201,380
1887	264	.....	52.800	1892	3,060	.....	212,160
1888	420	.....	29,134				

HARBOR AT WHITE LAKE, MICHIGAN.

This harbor is located about 17 miles northwest of Muskegon, at the mouth of White River, and is a broad, capacious body of water.

The outlet of White Lake was originally improved at local expense to about 5 feet.

The project of 1866 is to increase this to 12 feet, with an entrance width between piers and revetments of 200 feet. The full depth proposed has never been attained. The piers lack 200 and 250 feet respectively of the projected length, and to reach the 15-foot contour should extend about as far again.

The outer crib of the south pier has for some years been settling into the lake, and a new crib outside is required to sustain it. Large amounts of sand pass around the end of the north pier, which terminates at about the 8-foot contour in the lake, and repeated dredging is

needed to remove the deposits in the entrance. The pier should be extended to its full length.

The expenditures to July 1, 1892, were $262,914.18, and for the fiscal year, $9,241.45.

The extensive repairs to piers and revetments, begun in June, 1892, were continued until the end of November, closing gaps, refilling piers, renewing decking, sheet piling to prevent seepage of sand into the channel, and rebuilding rotten superstructure. A considerable further amount of repairing is needed, as some of the work over twenty years old is approaching its limit of endurance.

In May, 1893, there was but 10.5 feet in the entrance channel, which it was thought desirable to dredge.

It is estimated that $43,225 will be required to complete the existing project, and that $35,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Entrances and clearances.

Year.	Number.	Revenue collected.	Tonnage.	Year.	Number.	Revenue collected.	Tonnage.
Fiscal year—				Calendar year—			
1884	304	$1,347.23		1888	1,408		147,142
1885	1,416	476.16		1889	732		
1886	1,623	313.65		1890	579		62,276
1887	1,885		262,440	1891	405		47,135
1888	1,742		184,247	1892	392		58,950

HARBOR AT MARQUETTE, MICH.

The harbor of Marquette, on the south shore of Lake Superior, is considered one of the most valuable to shipping interests on the lake, not alone from a commercial point of view, but as a most excellent harbor of refuge. The city of Marquette, situated on this harbor, has a population of 9,000, according to the census of 1890, and extensive lumber and ore industries.

Originally this harbor afforded no protection to vessels from easterly or northeasterly storms, and in 1866 a project was approved for the construction of a breakwater composed of cribs filled with rock and projecting from the shore into the bay a distance of 2,000 feet. This pier was finished practically as projected in 1875, but since its commencement extensive repairs have been made to the superstructure.

As the timber composing the superstructure has been in place longer than its durability justifies, it is essential that it be replaced by more durable material. A project for a concrete superstructure was approved in February, 1890. Its estimated cost is $232,936.71.

In consequence of the increasing shipments of iron ore from this port the area protected proved to be too small for the needs of the shipping engaged in this commerce, and it became necessary to extend the breakwater.

In the river and harbor act of August 11, 1888, provision was made for the extension of the breakwater. There was finished 60 feet of crib work and 180 feet of riprap foundation. The contract of 1890 extended the breakwater 240 feet, leaving 700 feet to be built to complete it.

Under the existing contract 600 feet of the extension will be built, making 900 feet of the extension and total length of breakwater 2,900 feet.

The breakwater in its present condition gives much protection to the harbor.

The amount expended during the fiscal year ending June 30, 1893, was $22,884.95. The total cost of the work to June 30, 1892, was $379,569.18.

It is estimated that $257,936.71 will be required for the completion of the existing project, and that $134,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals	782
Clearances	788
Tonnage	1,474,002

Principal articles of export and import.

Articles.	Tons.	Articles.	Tons.
EXPORTS.		IMPORTS.	
Iron ore	1,026,074	Coal	143,880
Pig iron	16,106	Stone	690
Lumber	92,430	Oats	4,000
		Brick	800
Total	1,134,610	General merchandise	7,500
		Total	156,870

HARBOR AT LUDINGTON, MICH.

Ludington is situated on Lake Michigan at the mouth of the Marquette River, and is a terminal of the Flint and Pere Marquette Railway. Steamer service is maintained throughout the year, with heavy shipments of salt and receipts of flour and wheat.

The inner harbor is Pere Marquette Lake, on which the city is built. The natural outlet had about 6 feet of water. The project of 1867 called for 12 feet, with an entrance width between piers and revetments of 200 feet. In 1885 the scope of the project was enlarged in order to create a "harbor of refuge" for general lake commerce, with width of 400 feet and channel depth of 18 feet. In 1890, however, local circumstances indicated a preferable retention of the original width.

The harbor works, as completed in 1890, have a total length of 1,450 and 2,300 feet, respectively, the south pier being 350 feet the longer. While generally in good and effective condition, much of the older work is in need of repair.

With occasional dredging to remove deposits between the piers a satisfactory navigation of from 14 to 16 feet is maintained.

The total expenditures to July 1, 1892, were $349,216.57, and for the fiscal year, $758.44.

The channel depth continued at about 14.5 feet during the season of 1892. In November 13.6 feet was found, but in June, 1893, the least channel depth was 14.5 feet, the lake having risen a foot.

The dredge began work June 25 to widen and deepen the fairway, and by July 1 had taken out 4,858 cubic yards.

The stone filling in the outer portion of the south pier having settled considerably, provision was made for refilling it. The cribs are pro-

vided with partly open bottoms, in order that as erosion of the lake bed may take place from the action of the waves and currents the stone ballast shall pass down and maintain the solidity of the work, upon the aggregate mass of which its service and security depend.

It is estimated that $34,000 can be profitably expended improving this harbor during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Entrances and clearances.

Year.	Number.	Revenue collected.	Tonnage.	Year.	Number.	Revenue collected.	Tonnage.
Fiscal year—				Calendar year—			
1884	2,047	$1,451.81	.....	1888	1,778	.....	277,074
1885	1,468	425.57	.....	1889	1,759	.....	.....
1886	1,565	520.57	.....	1890	2,270	.....	461,997
1887	1,442	.....	259,800	1891	2,420	.....	610,057
1888	1,511	.....	270,316	1892	1,969	.....	538,568

HARBOR AT PETOSKEY, MICH.

Petoskey is a small town of some 3,500 inhabitants, situated on the south shore of Little Traverse Bay near its head. The present and prospective business of the place is small, and it is chiefly known as a popular summer resort.

Its water front is without anchorage, and a landing pier extending into the bay is exposed to heavy seas from north and northwest winds. Pursuant to the act of August 11, 1888, two projects had been submitted for furnishing shelter to shipping in that locality, one to construct a harbor in the bay by means of a pier projecting offshore from a point westward of the city and connecting with a breakwater extending eastwardly and covering the city front.

The sheltered area would be about 12 acres and vessels would lie in safety in any part of it, including the landing pier.

The estimated cost of the work was $170,000.

The alternative project was to rebuild and extend the landing-pier itself with an L or arm to the eastward, so that vessels could safely lie in the angle. The estimated cost was $70,000.

The act of September 19, 1890, appropriated $15,000 toward the construction of the breakwater project, and as the expenditure of this amount would accomplish no useful result, further action by Congress was awaited.

The act of July 13, 1892, appropriated $20,000 more, but provided that this and the previous sum should be expended on the landing-pier project.

The citizens of Petoskey and the interests concerned, preferring the larger project, which would be of much greater value to them, asked that action be deferred until Congress could be again memorialized on the subject. In the case of either project an additional appropriation of $35,000 is needed; if for the landing pier, in order that the entire work could be completed in one season, and if for the breakwater, in order that the shore pier, 550 feet long and not less than 350 feet of the total 1,200 feet of the breakwater proper, could be put under one contract.

In the year 1892 the total amount of shipments was 12,955 tons and of receipts 18,062 tons.

HARBOR AT SAUGATUCK, MICH.

Saugatuck Harbor, as the mouth of the Kalamazoo River is termed, has a natural depth in ordinary condition of 6 or 7 feet, and the project of 1869, revised in 1875 and 1882, proposed to deepen this to 12 feet and extend the entrance piers into the lake 200 feet apart. The works have never been completed and are now for the greater part in a ruinous condition, while from the immense accessions of sand from the naked waste bordering the river on the north and the absence of proper protection the depth has not been increased to exceed 8 feet, with 10 feet as an exceptional and temporary feature. The river is an outlet for a considerable traffic during the fruit season even with all its disadvantages, but for several years past the Government aid has been confined to dredging when the navigation became entirely obstructed.

The dredge worked on the bar and river for four months in 1892, removing 36,050 cubic yards; but in May, 1893, there was again but 6 and 5 feet, and at the urgent request of local interests the dredge was sent there again in June, and is still at work.

The total expenditures to July 1, 1892, were $139,094.25, and for the fiscal year $4,076.73.

It is estimated that $30,260 will be required to complete the existing project and that $25,000 can be profitably expended during the ensuing fiscal year.

HARBOR AT MENOMINEE, MICHIGAN AND WISCONSIN.

Previous to the improvement of this harbor the depth of water at the mouth of the Menominee River was about 4 feet, and the river was navigable for boats of that draft for some 2 miles above its mouth.

The project for the improvement of the harbor was adopted in 1871 and modified in 1874, the object being to afford a channel of entrance of navigable width and not less than 14 feet depth.

The amount expended up to June 30, 1892, was $211,653.27, resulting in the construction of two piers, 400 feet apart, the north pier 1,854 feet long and the south pier 2,710 feet long, with a dredged channel 3,000 feet long, 200 feet wide, and 16 feet deep, from the 16-foot contour in Green Bay to the lower end of the channel of the Menominee River, of the same depth and width.

It is estimated that $15,000 will be required for repairs to piers during the ensuing fiscal year.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR 1892.

Name of harbor, Menominee, Mich.; collection district, Superior, Mich.; nearest light-house, on north pier head, Menominee, Mich.

Arrivals and departures of vessels.

Description.	Arrivals.		Departures.	
	Number.	Tonnage.	Number.	Tonnage.
Steam	656	186,111	657	187,037
Sail	431	77,893	432	78,143
Total	1,087	264,004	1,089	265,180

By way of the harbor only:		By all ways of transportion:	
Exports ..... tons..	486,522	Exports ..... tons..	488,637
Imports ..... do....	38,129¾	Imports ..... do....	59,815½

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR 1892.

Name of harbor, Marinette, Wis.; collection district, Milwaukee, Wis.; nearest light-house, on north pier head, Menominee, Mich.

Arrivals and departures of vessels.

Description.	Arrivals.		Departures.	
	Number.	Tonnage.	Number.	Tonnage.
Steam	601	161,427	603	161,840
Sail	839	263,115	843	263,467
Total	1,440	424,542	1,446	425,307

By way of harbor only.

	Tons.	Value.
Exports	454,170	$5,500,000
Imports	13,200	450,000

HARBOR AT CHEBOYGAN, MICH.

Prior to improvement the natural entrance depth into Cheboygan River did not exceed 7 feet, and the project of 1871 called for a depth of 13 feet and width of 200 feet, extending to the 14-foot contour in the bay. It was also provided that the banks of the cut be protected with pile piers, but as the work progressed it was found that, owing to tenacious material through which the channel was dredged, the protection piers could be dispensed with and their entire cost saved.

With the deepening of the navigation, too, the harbor rapidly grew into importance, and the construction of extensive lumber piers bordering the cut now constitutes solid revetments for nearly half its length. Subsequent modifications were made, until it now calls for a channel 200 feet wide and 15 feet deep from deep water in the bay as far as the State road bridge across the river, a total distance of 7,200 feet.

In November, 1889, the project, so far as the dredge-work was concerned for the area in question, was practically completed, leaving a balance of $18,000 standing to the credit of the work, the expenditure of which was deferred until such time as the deterioration of the channel depths should necessitate further dredging, and the construction of the protection piers should be shown to be desirable.

During the seasons of 1890 and 1891 no complaints were made as to the condition of the channel, but in 1892 it was found that, partly owing to the low stage of water and partly on account of an accumulating deposit of sand, mud, and mill refuse, the channel depth had deteriorated so as to obstruct free navigation by the larger vessels accustomed to trade at this harbor. In a report upon this subject, under date of October 31, 1892, recommendation was made that instead of merely restoring the navigation to the condition in which it was left in 1889 an extension of the project be made, increasing the projected depth to 18 feet from the 18-foot curve in Duncan Bay to the State road bridge, and that the available balance be expended toward that object. This proposition has not yet been authorized.

There being no doubt, however, of the deterioration of the 15-foot channel in Cheboygan Harbor by sediment and otherwise, the unex-

pended balance is needed for restoring and maintaining the channel depth in accordance with the approved project, and it is therefore recommended that the sum of $18,197.68 be reappropriated and placed to the credit of the Cheboygan Harbor for the maintenance and improvement of the navigation. The amount can be profitably expended during the fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS, CHEBOYGAN HARBOR, MICHIGAN.

Entrances and clearances.

Years.	Number.	Tonnage.	Years.	Number.	Tonnage.
1887	1,587	405,921	1891	1,384	367,550
1889	1,496	453,456	1892	1,384	345,174

In addition to the above, 8 steamers, with an aggregate tonnage of 4,000 tons, trade regularly at this port, but are not entered or cleared at the custom-house.

Receipts and shipments by vessel, 1892.

[Compiled from statement furnished by Mr. John W. Loucks, collector of customs.]

Articles.	From custom-house books.		From warehouse books.		Total.
	Quantity.	Tons.	Quantity.	Tons.	Tons.
RECEIVED.					
Cement ..... barrels	95	14	600	90	104
Coal	.....	6,835	.....	.....	6,835
Freezing pans	250	2	.....	.....	2
Feed	.....	.....	.....	.....	2
Grain ..... bushels	113,000	2,184	12,000	2,398	2,582
Hay	.....	50	.....	.....	50
Iron	.....	600	.....	.....	600
Lime ..... barrels	150	15	3,000	300	315
Logs ..... M feet, B. M	3,975	7,950	.....	.....	7,950
Miscellaneous freight	.....	.....	.....	20,000	20,000
Oil ..... barrels	.....	.....	2,000	400	400
Plaster ..... do	.....	.....	400	60	60
Salt ..... do	150	21	2,500	350	371
Stone ..... cords	25	156	.....	.....	156
Total receipts	.....	17,827	.....	21,600	39,427
SHIPPED.					
Bark ..... cords	1,040	1,040	150	275	1,315
Brick ..... M	100	250	.....	.....	250
Lumber ..... M feet, B. M	141,820	248,184	3,350	5,863	254,047
Lath ..... M	27,228	8,168	3,000	900	9,068
Miscellaneous freight	.....	.....	.....	8,000	8,000
Pulp wood ..... cords	250	125	.....	.....	125
Posts	222,045	5,551	.....	.....	5,551
Shingles ..... M	14,321	1,791	40,000	5,000	6,791
Timber ..... cubic feet	158,000	3,268	.....	.....	3,268
Ties	217,456	16,309	.....	.....	16,309
Telegraph poles	696	104	2,000	300	404
Total shipments	.....	284,790	.....	20,338	305,128
Aggregate	.....	.....	.....	.....	344,555

HARBOR AT AHNAPEE, WIS.

This harbor is situated on the west shore of Lake Michigan at the mouth of the Wolf River, about 30 miles north of Milwaukee.

The increased harbor facilities secured through the appropriations thus far expended have had a favorable effect upon rates of freight and transportation, and have tended to increase commerce beyond the nat-

ural growth of the town, as a comparison with other places of about equal size, but where there are no harbor improvements, will show. Benefits have accrued, both to the general commerce of the lake and local interests, which the completion of the proposed improvement will undoubtedly increase.

The Ahnapee and Western Railroad, a new line connecting Ahnapee with the Kewaunee, Green Bay and Western Railroad at a point about midway between Kewaunee and Green Bay was completed in September, 1892. It is expected that this will increase the importance of this harbor.

Previous to the improvement of this harbor the depth of water at the mouth of the Ahnapee River was only about 2 feet.

The project of improvement, adopted in 1875, and modified in 1884, provided for the formation of a small artificial harbor connected with the lake by a channel 100 feet wide and 12 feet deep, formed by the construction of two piers extending to the 18-foot contour, with a 200-foot entrance between the pier heads.

The total amount expended up to June 30, 1892, was $165,240.80, resulting in the construction of two piers, the north one 1,102 feet long and the south one 1,125 feet; in the removal of 30,528 cubic yards of rock and 135,843 cubic yards of sand and gravel, and in placing a double row of sheet piling along 352 feet of the north pier. The rock was used for refilling and riprapping the piers.

During the fiscal year ending June 30, 1893, $1,382.80 has been expended in making minor repairs to the south pier and removing 2,140 cubic yards of material from shoal places in the channel.

It is estimated that $20,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

[For calendar year 1871, when improvements were commenced.]

	Arrived.		Cleared.	
	No.	*Tons.*	*No.*	*Tons.*
Steam vessels	107	27,100	107	27,100
Sailing vessels	203	53,900	201	53,785
Total	310	81,000	308	80,885

Arrivals and departures of vessels for calendar year 1892.

Description.	Arrivals.		Departures.	
	Number.	Tonnage.	Number.	Tonnage.
Steam	348	192,321	348	192,321
Sail	296	24,340	295	24,322
Total	644	216,661	643	216,643

HARBOR AT GREEN BAY, WISCONSIN.

This harbor is located at the extreme southern end of Green Bay, at the mouth of Fox River, and has a large and prosperous commerce.

Before the improvement of this harbor was begun the channel between the mouth of the Fox River and the deep water in Green Bay

was circuitous and narrow, with but 6 feet of water at its shoalest point.

The project of improvement was adopted in 1866, and subsequently modified, so as to provide increased depth, in 1872 and 1874, the object being to provide a dredged channel 200 feet wide, 14 feet deep, and 2 miles long, in place of the natural channel, with a revetted cut across Grassy Island.

The project was further modified in 1892 to increase the depth of the present channel to 16 feet and extend it in a direct line through the bar off Sable Point, making its total length 16,500 feet.

The act of Congress of July 13, 1892, appropriating $25,000 for improving harbor at Green Bay, Wis., provided "that $5,000 of said sum may, in the discretion of the Secretary of War, be expended on the Fox River, below De Pere, Wis."

During the last fiscal year 50,197.2 cubic yards was removed from the channel way between the mouth of the Fox River and Green Bay. This work is still in progress.

From the channel of the Fox River between De Pere and Green Bay, 41,575 cubic yards of material was removed, resulting in a channel way 14 feet deep and 145 feet wide, except for a small part of the distance.

There was expended up to the close of the fiscal year ending June 30, 1892, $293,751.95, resulting in a dredged channel 10,600 feet long, 200 feet wide, and 14 feet deep, and in the construction of 1,325 linear feet of revetment of the sides of a cut through Grassy Island.

During the year ending June 30, 1893, $7,296.52 was expended in dredging.

The present available depth of water is 14 feet, and, owing to the peculiar physical characteristics of this harbor, the navigable depth can not be increased or any additional benefit to navigation obtained until the proposed channel, 16,500 feet long, is dredged its entire length and made of navigable width. To accomplish this much-needed improvement an appropriation of $66,915 is recommended by the Engineers for the fiscal year ending June 30, 1895.

It is estimated that $71,915 will be required to complete the existing project.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for calendar year 1892.

Description.	Arrivals.		Departures.	
	Number.	Tonnage.	Number.	Tonnage.
Steam	450	169,867	455	169,878
Sail	277	60,496	278	61,051
Total	727	230,363	733	230,933

HARBOR AT KENOSHA, WIS.

This harbor is located on the west shore of Lake Michigan, about 30 miles south of Milwaukee. The city has over 6,000 inhabitants according to the census of 1890, extensive fisheries, and an active business in shipping wheat and and other products.

The original depth of water at the mouth of Pike Creek varied from absolute closure to 3 feet.

The original plan of improvement was adopted in 1852, and was directed to securing a channel 12 feet deep by constructing parallel piers and dredging between them. This plan was modified in 1866 so as to secure 15 feet of water by extending the piers and dredging deeper.

A further modification of the project was made in 1889, providing for the extension of the north pier 300 and the south pier 600 feet.

There was expended upon this harbor up to June 30, 1892, $252,607.72, resulting in the construction of two piers, north and south, 1,600 and 950 feet in length, respectively, 150 feet apart, with a channel of varying depth. In 1875 and 1876 the channel was dredged to 15 feet, but subsequent appropriations sufficed only to maintain a channel of about 12 feet. An area of about 3 acres were also dredged in the inner harbor to a depth of 14 feet.

Soundings taken in April, 1892, showed an available depth of channel of only 12½ feet, with a small bank in mid-channel on which there was but 12 feet of water.

Eight thousand and sixty-four cubic yards of material was removed from the channel in May and June, 1892, and this work was continued until July 25, 1892, removing in all 15,568 cubic yards.

Soundings taken in April, 1893, showed that a bank had re-formed at the extremities of the piers and along the mid-section of the south pier. Dredging was begun again, and on June 30, 1893, 2,693.65 cubic yards had been removed.

During the fiscal year ending June 30, 1893, $3,525.92 was expended in dredging the channel to restore it to a depth of 15 feet and a width of 80 feet, and the work is still in progress. The channel can be maintained only by frequent dredging until the piers are further extended.

The work of extending the north pier 100 feet and the south pier 50 feet was to have been completed by October 31, 1893.

It is estimated that $49,500 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for calendar year 1892.

Description.	Arrivals.		Departures.	
	Number.	Tonnage.	Number.	Tonnage.
Steam	29	5,713	29	5,713
Sail	145	20,285	145	20,868
Total	174	25,998	174	26,581

HARBOR AT KEWAUNEE, WIS.

Kewaunee is located about 100 miles north of Milwaukee and 27 miles east of Green Bay. The chief importance of the port is derived from the lumbering business entering there and from its natural advantages as a harbor of refuge. Even in the present incomplete condition of the harbor it affords shelter to numerous vessels during the severe storms which frequent this coast. The natural entrance to this harbor was through the Kewaunee River. The river mouth was not more than 20 feet wide, with a depth of about 2 feet at its shoalest point, and was obstructed by submerged bowlders.

The project of improvement was adopted in 1881. Its design was to cut a channel 14 feet deep through a neck of land between the river and the lake at a point about 2,000 feet south of the river mouth, and to continue this channel to deep water in the lake by the construction of two parallel piers 200 feet apart, extending from each side of the cut lakeward to the 18-foot contour.

The total amount expended on this harbor up to the close of the fiscal year ending June 30, 1892, was $74,621.93, in addition to which the local harbor commissioners had expended $8,042.72. At that time 1,250 feet of the north pier and 1,125 feet of the south pier had been constructed, and there was a governing depth in the entrance channel of about 11½ feet.

During the fiscal year ending June 30, 1893, $6,394.07 was expended in dredging and pier extension. Further pier extension is now progressing under contract and will be completed this season.

Soundings taken in April, 1893, showed a channel, centrally located between the piers, 50 feet wide and 13 feet deep.

The completion in October, 1891, of a railroad between Kewaunee and Green Bay, forming with existing railroads and a line of steamers plying across Lake Michigan between Kewaunee and Frankfort, Mich., a through route of transportation between the Missouri River and the Atlantic seaboard, has greatly increased the importance of this harbor. Two steamers, for the carriage of twenty-four cars each between Kewaunee and Frankfort, each 256 feet over all, 54 feet beam, and drawing 12 feet of water, have been operated during the past winter and spring.

It is estimated that $86,957.28 will be required to complete the existing project, and that $75,000 can be profitably expended during the ensuing fiscal year.

Arrivals and departures af vessels.

Description.	Arrivals.		Departures.	
	Number.	Tonnage.	Number.	Tonnage.
Steam	690	426, 642	690	426, 642
Sail	213	13, 144	213	13, 144
Total	903	439, 786	903	439, 786

HARBOR AT MANITOWOC, WIS.

This is one of the most important harbors on the west shore of Lake Michigan. A large number of vessels annually seek shelter here from storms, while many also enter to avail themselves of the advantages afforded by the shipyards and dry docks.

The harbor has been of benefit to general and local commerce, and the prospective advantages to be secured seem to justify a completion of the proposed project.

Previous to the improvement of this harbor but 3 feet of water existed at the shoalest point over the bar at the mouth of the Manitowoc River.

The original project adopted in 1852 provided for the construction of two parallel piers, 220 feet apart, extending from the mouth of the river to the 12-foot contour in Lake Michigan. In 1881 this was modified so as to secure a deeper channel by extending the piers to a depth of 18½ feet and dredging to not less than 14 feet.

The total amount expended up to June 30, 1892, was $307,067.38, resulting in the construction of two piers, the north one 1,970 feet and

the south one 1,900 feet long, 228 feet apart at the shore line and 250 feet at the outer ends, renewal of superstructure of piers, and in the removal of 196,891 cubic yards of material by dredging.

During the fiscal year ending June 30, 1893, $2,207.82 has been expended in dredging 4,173 cubic yards of material from the channel.

Soundings taken in April, 1893, showed a depth of water at entrance of 17 feet and a navigable channel, midway between the piers, about 14.7 feet deep.

The engineer in charge of these works says:

About 900 feet of the inshore superstructure is twenty-one years old or more. It is badly decayed, and should be rebuilt above the water line as soon as practicable. It is contemplated to rebuild about 350 feet of it with funds now available, this section being so dilapidated as to be unsafe. About 7,500 cubic yards of material should be removed from the channel to restore its depth to 16 feet, as soon as the services of a dredge can be obtained.

It is estimated that $38,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

Arrivals and departures of vessels for calendar year 1892.

Description.	Arrivals.		Departures.	
	Number.	Tonnage.	Number.	Tonnage.
Steam	876	527,288	881	528,174
Sail	286	70,948	293	72,422
Total	1,162	598,236	1,174	600,596

HARBOR OF REFUGE AT MILWAUKEE, WIS.

Milwaukee Bay is formed by an indentation in the west coast of Lake Michigan, the distance between the headlands being nearly 8 miles and the extreme width west of the line joining the headlands about 2 miles. Although an open roadstead, the bay may properly be termed the outer harbor of Milwaukee, as the anchorage ground is good and protected by the coast from storms from all directions, except from northeast to southeast, which defect will be entirely remedied by the completion of the existing project, thus affording an enormous amount of commerce ease of access, deep water, ample room, and safe shelter within Milwaukee Bay.

The additional security to navigation and commerce which will be afforded by a harbor of refuge at this point, extends to the greater portion of the commerce of the Great Lakes. Some idea of the magnitude of the commerce to be benefited by the formation of this refuge can be had from an inspection of the commercial statistics given for the harbor of Milwaukee, and also from the following extract from a report of the Milwaukee Board of Trade upon this subject, made in 1880:

The combined annual commerce of the customs districts of Milwaukee and Chicago exceeds by 4,000,000 tons the combined annual commerce of Boston, Baltimore, and Philadelphia, and nearly equals the total foreign commerce of New York City.

The project for the work was approved in 1881, and contemplated the formation of an artificial harbor inclosing that portion of Lake Michigan forming Milwaukee Bay within a breakwater of crib work upon a stone foundation. This harbor will furnish 417 acres of safe mooring ground beyond the 18-foot contour and about twice this area beyond the 12-foot contour.

The actual length of the breakwater, when completed, will be 7,250 feet.

Work began in 1881, and up to June 30, 1892, there had been expended $469,144.52, 4,150 feet of substructure and 3,850 feet of superstructure being completed.

During the fiscal year ending June 30,1893, $5,511.58 was expended in part payment for 100 additional feet of substructure and for cost of care, repairs, and lighting. But 100 feet of substructure was removed and 1,600 linear feet of superstructure badly damaged by the storm of April, 1893. The present length of the work is therefore the same as in 1892. The work of repair is in progress at the close of the fiscal year. There remain to be constructed 3,100 feet of substructure and 3,400 feet of superstructure to complete the work.

The harbor is now used to a very considerable extent as a shelter from northeast storms, and its value will rapidly increase as the breakwater is extended.

It is estimated that $234,739.91 will be required to complete the existing project, and that $200,000 can be profitably expended during the ensuing fiscal year.

HARBOR AT MILWAUKEE, WIS.

The original depth of water at the mouth of the Milwaukee River was not more than 3½ feet.

The original project was adopted in 1852, and was directed to securing 12 feet of water at the entrance to the river and to protecting the channel by parallel piers. In 1868 this was modified so as to secure a channel 18 feet deep by extending the piers 600 feet and dredging. The project has been completed, and consequently the only expenditures now demanded are for the maintenance of the piers by timely repairs and of the depth of the channel by dredging.

Up to the close of the fiscal year ending June 30, 1892, there had been expended on this harbor $330,380.47, in addition to $321,355.66 expended by the city of Milwaukee, resulting in the completion of the modified project of 1868.

During the fiscal year ending June 30, 1893, $7,268.24 has been expended in repairs to south pier and protection piling to north pier.

Soundings taken in May, 1893, show that between the piers there is a channel more than 100 feet wide, having a depth of 17 feet. Outside the pier heads the water is fully 18 feet below the datum plane.

It is estimated that $20,000 will be required for repairs of piers and dredging during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for calendar year 1892.

Description.	Arrivals.		Departures.	
	Number.	Tonnage.	Number.	Tonnage.
Steam	3,927	3,229,859	3,996	3,124,350
Sail	2,151	407,758	2,436	390,762
Total	6,078	3,637,617	6,432	3,515,112

Receipts	tons	4,286,295½
Shipments	do	1,709,686¾
Amount of revenue collected during the year		$465,833.09
Bank deposits		$977,160,024.35
Receipts of office of internal revenue		$3,491,885.62
Number of manufacturing establishments		3,560
Capital invested		$94,399,500.00

HARBOR AT PORT WASHINGTON, WIS.

The natural channel at the mouth of the Sauk River was narrow, and at the shoalest point had a depth of but 1 foot.

The original project for the improvement of this harbor was adopted in 1869, and provided for two parallel piers, extending to 10 feet of water in Lake Michigan and the excavation of an interior basin. This plan was modified in 1870, and again in 1876, and now provides for the excavation of two interior basins, with a combined area of $5\frac{3}{4}$ acres, with a depth of 12 feet, and a channel of the same depth connecting the basins with the lake.

The total expenditure up to June 30, 1892, was $177,374.54, and resulted in the construction of a north and south pier, 920 and 1,226 feet long, respectively, with 400 feet of revetment along the north bank of the river, extending to the inner end of the south pier; in the formation of two interior dredged basins of $2\frac{3}{4}$ and 3 acres, respectively. The north basin had a depth of 12 feet over nearly its entire area, and a narrow channel 12 feet in depth from abreast the inner end of the north pier to the upper end of the west basin, although the average depth did not exceed 8 feet.

There was expended during the fiscal year ending June 30, 1893, $6,347.91 in extending the south pier 100 feet.

Soundings taken in March, 1893, indicated a ruling depth of water in the entrance channel of $10\frac{1}{2}$ feet.

It is estimated that $12,000 will be required for repairs and dredging during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for calendar year 1892.

Description.	Arrivals.		Departures.	
	Number.	Tonnage.	Number.	Tonnage.
Steam	63	5,985	62	5,910
Sail	114	9,120	114	9,120
Total	177	15,105	176	15,030

HARBOR AT RACINE, WIS.

The city of Racine is located upon the west shore of Lake Michigan, about 20 miles south of Milwaukee. It has a population of about 20,000, and its trade and number of inhabitants are both steadily increasing.

The entrance to this harbor originally varied in depth from absolute closure after storms to about 6 feet.

The original project was adopted in 1842 or 1843, and contemplated a channel 12 feet deep. In 1866 the project was modified to provide a channel 15 feet deep.

The project was further modified in 1889, providing for 300 feet extension to the north pier, 500 feet to the south pier, and an increase of channel depth of water to 16 feet.

There has been expended up to June 30, 1892, $280,426.54 in the construction of a north and a south pier, 1,460 and 1,270 feet long, respectively, and in dredging the channel to 16 feet depth of water.

Soundings taken in April, 1893, show that but 13 feet of water could

be carried into the harbor, and that there was then only a very narrow channel of that depth.

The work is now under contract for extending the north pier 150 feet and the south pier 100 feet.

During the fiscal year ending June 30, 1893, $2,185.38 has been expended in dredging the channel, restoring it to 15 feet in depth for a width of 80 feet.

The constant shoaling at the entrance to this harbor shows that the piers will have to be extended several hundred feet in order to maintain the intended depth. Some 1,100 feet of the superstructure of the piers should be rebuilt.

It is estimated that $39,500 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for calendar year 1892.

Description.	Arrivals.		Departures.	
	Number.	Tonnage.	Number.	Tonnage.
Steam	693	488,201	691	487,846
Sail	508	78,122	509	76,781
Total	1,201	566,323	1,200	564,627

HARBOR AT SUPERIOR BAY AND ST. LOUIS BAY, WISCONSIN.

The harbor at Superior Bay is located at the extreme western end of Lake Superior.

Originally the natural entry to Superior Bay was obstructed with shifting bars having at most but 9 feet depth of water over them. The citizens of Superior attempted to remedy this by constructing piers to confine the outflowing waters of the bay, and this work was taken up by the United States in 1867, and has successfully maintained since then a ruling depth of 16 feet between the piers.

The piers are 350 feet apart, and a good deal of dredging has been necessary to obtain the required depth between them and the channels leading to Connor Point and the Quebec Dock and a new connecting channel in St. Louis Bay. The original project of 1867 has, therefore, been modified from time to time to meet the needs of the rapidly increasing capacity of the vessels visiting this port, the last modification being made by act of Congress approved August 5, 1886, which added improvement of channel in St. Louis Bay.

In carrying out the original project with modifications there had been expended to June 30, 1892, the sum of $218,827.60.

Under existing contract for dredging it is expected the following results will be obtained:

A depth of 18 feet over a width of 300 feet in the entry between the piers; easing off the corners leading into and out of the Quebec Channel; opening new channel, 16 feet deep and 100 feet wide, some 2,200 feet in a northerly direction from Quebec Dock, along west side of Superior Bay; increasing width of channel at Connors Point; widening and extending 16-foot channel in St. Louis Bay westward along West Superior dock line.

The length of this extension will be about 3,400 feet and its width 60 feet.

The entry piers need extensive repairs, particularly the superstructure. The entry and dredged channels have full 16 feet depth.

It is estimated that $156,736 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and clearances of vessels.

Year.	Arrivals and clearances.	Tonnage.
1891	1,610	2,064,463
1892	1,940	2,496,507
Increase	330	432,044

Average vessel tonnage:

1891	1,282
1892	1,287
Increase	5

Of the number of vessels reported above for 1892, 1,515 were steam and 425 sailing vessels.

The storage capacity of the Superior elevators is 8,300,000 bushels.

Two large new elevators, of a total capacity of about 3,000,000 bushels, were built during the past year on Superior Bay, near Quebec Channel, and will be ready to handle the wheat crop of 1893.

HARBOR AT SHEBOYGAN, WIS.

Sheboygan is located on the western shore of Lake Michigan, about 40 miles north of Milwaukee. It is a flourshing and prosperous city of 16,000 inhabitants, according to the census of 1890, doing a large business both by rail and water. A continuation and completion of the improvements already so far advanced would sustain and increase this business, conferring benefits upon general commerce and local interests.

Previous to the improvement of this harbor the natural channel had a depth not exceeding 4 feet on the bar at the entrance of the river.

The original project for improvement was adopted in 1852, and had for its object the formation of a 12-foot channel entrance to the mouth of the Sheboygan River. This was modified in 1873 so as to secure a deeper channel by further pier extension and dredging. Both projects were completed within their estimated cost, and a channel was formed 100 feet wide, with a depth of 15 to 16 feet between the piers. This was further modified in 1881, the present project having for its object to deepen the channel still further by extending the piers to the 20-foot contour in the lake and dredging to a depth of 18 feet between their outer ends, the depth decreasing to 14 feet at the shore line.

The total expenditure up to June 30, 1892, amounted to $318,256.03, resulting in the construction of a north and a south pier 2,270 and 2,387 feet long, respectively, and the removal by dredging of 249,548 cubic yards of material.

A survey made in April, 1892, showed a governing depth of water in the channel to be about 13.7 feet.

There was expended during the fiscal year ending June 30, 1893, $6,761.16 in pier extension and dredging. The work of pier extension is now in progress, and the dredging has resulted in a channel midway between the piers 100 feet wide and 16 feet deep.

It is estimated that $106,900 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for the calendar year ending December 31, 1892.

Description.	Arrivals.		Departures.	
	Number.	Tonnage.	Number.	Tonnage.
Steam	550	355,584	562	355,605
Sail	645	74,508	616	73,675
Total	1,195	430,092	1,178	429,280

HARBOR AT ASHLAND, WIS.

Ashland is located on the south side of Chequamegon Bay, Lake Superior, about 60 miles east of Duluth, Minn., has a population of 10,000 according to the census of 1890, and, though a comparatively new city has already developed quite an extensive commerce, which may in part be attributed to the four lines of railroad entering this city, among them the Northern Pacific. The principal exports are iron ore and lumber, but as some large manufacturing interests are located here it is probable that the variety of the articles exported will soon experience as considerable an increase as is taking place steadily in the case of the staple exports. The prospects are very encouraging, and, in all likelihood, if the tempestuous features of the beautiful bay which forms its harbor can be eliminated, the city's prosperity is assured.

The harbor originally had no protection from the waves which rolled into the bay or from the waves generated within the bay itself by storms.

The approved project is for the construction of a pile, slab, and rock breakwater, 8,000 feet long, northeast of the town, and for dredging a channel in front of the wharves of the city to accommodate vessels drawing 16 feet of water. During the season of 1889 a portion of the breakwater, 4,650 feet in length, was completed, but a severe storm in November the same year destroyed the outer 50 feet, and the slab filling settled in some places. During 1891, 1,080 feet was added to the breakwater, making its present length 5,680 feet, the breach in Chequamegon Point was closed with a brush and stone dike and the old part of the breakwater repaired.

Under existing contract it is expected about 1,680 feet will be added to the breakwater.

No dredging has yet been done.

The amount expended during the year was $943.67.

The total amount expended under approved project to June 30, 1892, was $137,138.67.

The breakwater, though of insufficient length to give full protection to all the wharves of the city, has nevertheless had a marked influence in improving the tranquility of the harbor.

It is estimated that $119,500 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Comparative statement of receipts and shipments for six years.

	Tons.		Tons.
1887	1,401,454	1890	2,816,924
1888	1,357,472	1891	3,217,541
1889	1,971,213	1892	4,267,097

Arrivals and clearances of vessels for six years.

	Tons.		Tons.
1887	892	1890	4,489
1888	2,375	1891	4,099
1889	3,171	1892	7,104

HARBOR AT TWO RIVERS, WIS.

The harbor at Two Rivers is located on the west shore of Lake Michigan, about 80 miles north of Milwaukee. The commerce of this port is comparatively small, nearly all the freighting being done by rail. Previous to the improvement of this harbor the natural channel was obstructed by a bar covered by but 2 or 3 feet of water.

The project of improvement adopted in 1870 provided for the formation of a channel of navigable width and not less than 12 feet deep, to be accomplished by the construction of two piers extending from the mouth of Two Rivers lakeward to the 18-foot contour in Lake Michigan and dredging a channel between them.

The amount expended up to the close of the fiscal year ending June 30, 1892, was $202,900.14, which was expended in the construction of two parallel piers, the north and south piers being 1,810 and 1,710 feet long, respectively, in dredging and in repairs to the piers.

During the fiscal year ending June 30, 1893, $1,587.57 was expended in making minor repairs to south pier and sand fences, in building a new sand fence on the north side of the harbor, and in dredging 16,440 cubic yards of material from the channel.

Soundings taken in April, 1893, showed a governing depth in entrance channel of about 9½ feet. There was at the close of the fiscal year a channel 120 feet wide and 12 feet deep nearly completed.

The amount of money spent in improving this harbor has to some extent benefited its commerce, and it is believed that the reduction in cost of transportation, the decrease of marine insurance rates, and the facilities offered shipping by the improved harbors on this coast, aided by the development of the ore and lumber industries in this vicinity, will before long cause commerce to take such strides as will demonstrate the wisdom and necessity of these improvements.

It is estimated that $59,088.80 will be required to complete the existing project and that $12,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels.

Description.	Arrivals.		Departures.	
	Number.	Tonnage.	Number.	Tonnage.
Steam	74	64,300	74	64,300
Fishing tugs	600	.....	600	.....
Sail	120	28,975	120	28,975
Total	794	93,275	794	93,275

HARBOR OF REFUGE AT STURGEON BAY CANAL, WISCONSIN.

Before the construction of this harbor was undertaken the Lake Michigan entrance to the Sturgeon Bay and Lake Michigan Ship Canal was entirely unprotected from storms ranging from northeast to southwest.

The project of constructing a harbor of refuge at this point was adopted in 1873 and modified in 1879 and 1880. The modified project, as carried out, consists of two piers, each 1,344 feet long, 850 feet apart at the shore line, protecting the lake entrance of the canal, and converging so as to make the harbor entrance 335 feet wide, inclosing an area of about 10 acres, with a depth of at least 16 feet.

The total expenditure of this harbor up to June 30, 1892, was $166,773.40, resulting in the completion of the piers as projected and in a dredged channel 16 feet deep and 120 feet wide from the 16-foot contour in Lake Michigan to the canal entrance.

During the fiscal year ending June 30, 1893, repairs were made to the sheet piling of the north pier, the guide piling of the south pier, and the dredging plant. Ten thousand six hundred and sixty cubic yards of material was removed from the channel in July, 1892.

Soundings taken in April, 1893, show that the governing depth has been reduced by deposits of material to 14.3 feet.

It is estimated that $7,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

Arrivals and departures of vessels for calendar year 1892.

Description.	Arrivals (bound down).		Departures (bound up).	
	Number.	Tonnage.	Number.	Tonnage.
Steam (exclusive of local tugs)	917	197,155	958	205,970
Sail	1,209	259,935	1,071	230,265
Total	2,126	457,090	2,029	436,235

HARBOR AT OCONTO, WIS.

In its natural condition the channel at the entrance to the Oconto River was obstructed by a bar with less than 2 feet of water over it. Previous to 1881, when the first appropriation was made for its improvement, the citizens, by the construction of a small amount of slab pier and by dredging, had increased the depth to 3½ feet.

The project of improvement, adopted in 1882, proposes to secure an 8-foot channel from Green Bay to the city of Oconto, a distance of 2 miles, by dredging and constructing piers, at an estimated cost of $150,000.

The total amount expended up to June 30, 1892, was $67,890.77, resulting in the building of two piers, the north pier 1,603 feet and the south pier 2,151 feet in length, the latter being the full length contemplated by the approved project in the removal of 405,356 cubic yards of material and minor repairs. Owing to the narrowness of the dredged channel and the soft character of the material the spring freshets have a tendency to obliterate the dredging of the previous year.

There were no operations during the fiscal year ending June 30, 1893.

Soundings taken in April, 1893, show the governing depth to be about 7½ feet at the harbor entrance and about 7 feet in the river as far up as Spies' Mill.

It is estimated that $79,000 will be required to complete the existing project, and that $10,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for calendar year 1892.

Description.	Arrivals.		Departures.	
	Number.	Tonnage.	Number.	Tonnage.
Steam	200	10,000	200	10,000
Sail	75	4,000	75	4,000
Total	275	14,000	275	14,000

HARBOR AT DULUTH, MINN.

Duluth is situated on the western end of Lake Superior, at the head of navigation on the Great Lakes.

It is the eastern terminus of the Northern Pacific Railroad and has a traffic in lumber, grain, flour, etc., second to none on Lake Superior.

Immense deposits of iron, granite, and freestone found in this vicinity contribute in no small measure to the commercial importance and prosperity of the city.

COMMERCIAL STATISTICS.

Comparative statement of arrivals and clearances of vessels at Duluth for sixteen years.

Year.	Arrivals.	Clearances.	Total.	Year.	Arrivals.	Clearances.	Total.
1877	329	228	567	1885	808	898	1,797
1878	406	343	749	1886	1,026	995	2,021
1879	502	497	999	1887	1,237	1,238	2,475
1880	524	524	1,048	1888	1,100	1,100	2,200
1881	666	660	1,326	1889	1,263	1,265	2,528
1882	833	832	1,665	1890	1,266	1,268	2,534
1883	796	779	1,575	1891	1,444	1,451	2,895
1884	888	903	1,791	1892	1,735	1,747	3,482

Average vessel tonnage for eight years.

	Tons.		Tons.
1885	761	1889	970
1886	778	1890	1,081
1887	812	1891	1,129
1888	887	1892	1,095

The storage capacity of Duluth elevator system is 21,300,000 bushels, and that of Duluth elevators proper 12,650,000 bushels. The following table gives the receipts and shipments of wheat for twenty-two years:

Year.	Receipts.	Shipments.	Total.	Year.	Receipts.	Shipments.	Total.
Ending Dec. 31—	*Tons.*	*Tons.*	*Tons.*	Ending Aug. 31—	*Tons.*	*Tons.*	*Tons.*
1892	1,399,817	932,222	2,332,039	1881	99,965	85,966	185,931
1891	1,144,082	1,058,449	2,202,531	1880	40,430	43,610	84,040
1890	460,244	427,725	887,969	1879	45,722	44,617	90,339
1889	513,827	409,410	923,237	1878	54,092	54,000	108,092
1888	239,802	404,485	644,287	1877	13,817	15,117	28,934
1887	514,089	585,558	1,099,647	1876	43,536	41,292	84,828
1886	675,977	530,048	1,206,025	1875	34,137	32,436	66,573
1885	446,590	421,973	868,563	1874	67,224	72,725	139,949
1884	411,688	346,537	758,235	1873	59,444	47,495	106,939
Ending Aug. 31—				1872	27,948	28,531	56,479
1883	141,234	137,607	278,841	1871	16,703	16,345	33,048
1882	97,987	99,264	197,251				

The above figures show the movement of wheat at the head of the lake (Duluth and Superior combined).

The receipts of coal for this harbor have likewise increased enormously, amounting in 1892 to 1,168,068 tons. The commerce as shown by the above statistics undoubtedly warrants the enlargement of this harbor.

The original project for improvement, adopted in 1871, consisted of a breakwater in Lake Superior outside of Minnesota Point in continuation of one already commenced by the Northern Pacific Railroad Company. This breakwater was destroyed by a storm in 1872 and was abandoned. In 1873 Congress provided for maintaining the canal through Minnesota Point, which had been constructed by the city of Duluth, and for dredging channels in Superior Bay to the Duluth docks. There was expended under this project to 1881, $270,651.81.

The present project was adopted in 1881 and was modified in 1884 and 1888, the object being to preserve the piers bordering the canal, dredging an inner harbor to accommodate vessels drawing 16 feet of water, a channel parallel with the Park Point Dock line 100 feet wide, a channel east of Rice Point 200 feet wide and 17 feet deep, and a channel along the north shore of St. Louis Bay 200 feet wide, 17 feet deep.

The river and harbor act of July 13, 1892, authorized the expenditure of $45,000 of the amount appropriated for this harbor in improving the channel of St. Louis River above Grassy Point.

The amount expended under the present project to June 30, 1893, is $415,802.98; the total amount expended to that date including the previous project is $686,454.79. The work has resulted in increasing the dredged area of the harbor basin to about 104 acres, exclusive of private dredging, removing shoals from area previously dredged, giving the whole dredged basin a minimum depth of 16 feet, maintaining the canal piers, and making narrow 16-foot channels east of Rice Point and on north shore of St. Louis Bay.

Work during the past year consisted in enlarging the channel along the east side of Rice Point and on the north side of St. Louis Bay. This gives the former a uniform width of 200 feet with a greater width at the bend, and wide, flaring entrances at each end. The current work on the latter channel is expected to widen it from the present 100 feet to 160 feet throughout its length to Grassy Point.

The work contracted for under the current appropriation to improve the St. Louis River above Grassy Point is expected to give in that river a continuous navigable channel up to Ironton, having a least depth of 16 feet and a minimum width of 90 feet, with long reaches of greater width and depth.

The canal piers are in a poor condition, and the entire work needs to be replaced with an improved and permanent structure.

The harbor basin and connecting channels will eventually require deepening to 22 feet. The channels recently commenced should be completed at an early date, both for the accommodation of commerce and as a matter of economy. The ruling depths in the portions of the harbor dredged by the United States are:

	Feet.
In canal	17
In the inner basin or harbor	16
In channel on north shore of St. Louis Bay for a distance of about 12,900 feet	16
In new channel east of Rice Point	16

In compliance with a requirement of the river and harbor act of 1892 an investigation was made with a view of determining the question of ownership of the ground on which are located the canal, canal entrances, and piers in this harbor, and if the title of the United States thereto was complete.

The engineer submitted the following recommendations to the Secretary of War, which papers were transmitted to the Fifty-second Congress, second session:

(1) That negotiations be entered into by the Secretary of War with the city of Duluth with a view to securing the unconditional donation of the land needed, accompanied by vacation of the abutting streets.

(2) That in the event the city refuses to make an unconditional donation, but accompanies the donation with the reservation of a right of way for a tunnel, Congress be requested to empower the Secretary of War to accept such conditional donation of the land, provided the said tunnel follow such lines and grades as the Secretary of War may approve.

Plans for a tunnel under the canal, proposed to be constructed by the city of Duluth, were approved by the Secretary of War April 26, 1893.

It is estimated that $122,026 will be required to complete the existing project, and that $237,332 can be profitably expended improving this harbor during the ensuing fiscal year.

HARBOR AT GRAND MARAIS, MINN.

Grand Marais, Minn., on the north shore of Lake Superior, is distant about 110 miles from Duluth. The harbor is valuable as a refuge for vessels, being within a few miles of the course taken by steamers running from Duluth, Port Arthur, and other lake ports, and is the only basin available as a harbor of refuge on that dangerous line of coast. A number of American vessels are engaged in the fishing industry in this vicinity, and to them this harbor is also exceedingly valuable.

The harbor was originally a natural harbor basin, but not wholly protected from storms, and of insufficient depth to admit vessels of large size; the approved project of 1879, therefore, proposed two breakwater piers, each 350 feet long, from the east and west points of the bay, or one pier 700 feet long from the east point, and the dredging to a depth of at least 16 feet of an anchorage area of about 26 acres at a total estimated cost of $139,669.40. Up to the close of the fiscal year ending June 30, 1892, there had been expended on this work $115,883.71; with this sum 350 feet of the east pier had been completed and the 16-foot anchorage area increased to 21.5 acres.

Under the present contract, work to commence July 1, 1893, for dredging, this anchorage area will be still further increased to 25 acres. The completion of this contract will practically exhaust the last appropriation.

It is estimated that $12,319 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The commerce at this place is small at present, but has possibilities of great increase, due to rich mineral deposits in the back country. Should these be opened up and connected with the lake by a railroad, the harbor will become an important point for the shipment of ore.

Freight received and shipped for eleven years.

Year.	Tons.	Value.	Year.	Tons.	Value.
1882	224	$25,691	1888	460	$44,871
1883	239	27,595	1889	252	29,349
1884	270	30,198	1890	275	32,035
1885	390	41,484	1891	319	32,687
1886	475	48,519	1892	756	65,374
1887	312	29,059			

Arrivals and clearances of vessels for eleven years.

Year.	Arrivals.	Clearances.	Year.	Arrivals.	Clearances.
1882	134	134	1888	190	190
1883	131	131	1889	168	168
1884	152	158	1890	268	268
1885	188	190	1891	160	159
1886	210	210	1892	146	145
1887	164	164			

HARBOR AND AGATE BAY, MINN.

This is a shipping port for iron ore, and when the breakwater piers are built will form a harbor of refuge. It is 27 miles east of Duluth.

The rapid increase in the commerce of the harbor caused Congress to undertake its improvement by the adoption of the present project (in 1887) which contemplates the erection of two piers projecting from the headlands of the bay and inclosing about 109 acres of water area. The eastern pier is to be 1,000 feet long and the western one 900 feet. Work upon the east pier was commenced in 1887, and at the close of work in November, 1891, 750 feet of it had been built.

Under existing contract 200 feet of western pier, in the line of prolongation of the east pier, will be built.

The beneficial effects of the work done are greater than were anticipated, the tranquillity of the harbor has been greatly augmented, and vessels are no longer obliged to put to sea during storms, but can find safety under the shelter of the breakwater.

The amount expended to June 30, 1892, was $61,384.59; amount expended during fiscal year ending June 30, 1893, $726.99.

It is estimated that $151,708 will be required to complete the existing project and that that amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Vessels arriving and departing at Agate Bay, Minnesota.

Year.	Vessels.	Estimated tonnage.	Increase.
1885	174	295,800	.....
1886	263	460,000	164,200
1887	465	697,500	237,500
1888	749	1,436,000	738,500
1889	1,255	2,400,000	964,000
1890:			
Steam, 968	1,050	2,625,000	225,000
Sail, 82			
1891:			
Steam, 1,188	1,250	2,915,000	290,000
Sail and whaleback, 62			
1892:			
Steam, 1,104	1,330	3,101,600	186,600
Sail, 186			
Whaleback, 40			

Receipts and shipments.

Year.	Ore shipped.	Other freight received and shipped.	Total.	Year.	Ore shipped.	Other freight received and shipped.	Total.
	Tons.	*Tons.*	*Tons.*		*Tons.*	*Tons.*	*Tons.*
1885	225,484	10,895	236,379	1889	924,054	31,731	955,785
1886	304,396	21,954	326,350	1890	984,215	37,268	1,021,483
1887	394,252	6,620	400,872	1891	1,000,052	41,181	1 041,233
1888	509,964	30,352	540,316	1892	1,304,885	54,477	1,359,362

HARBOR AT OAKLAND, CAL.

The city of Oakland, Cal., has a population of about 49,000. The freight terminus of the main system of the Southern Pacific Railroad is on Oakland Harbor.

The principal features of this improvement as originally projected are (1) two mid-tide training walls of rubblestone extended from the shore westward into San Francisco Bay about 2 miles; (2) a connection by a canal 1½ miles in length with the estuary of San Leandro; (3) a dam at the mouth of this estuary; (4) dredgings of basins and channels to give a depth of 20 feet at low tide, which at high tide will accommodate vessels of the largest class.

Two modifications of the original project have been adopted, namely, to increase the width of tidal canal from 300 to 400 feet, and to raise the height of jetties from half-tide level to full high water.

In the original condition of the entrance the low-water channel depth was about 2 feet, admitting at time of high tide vessels drawing 6 to 8 feet of water. The present navigable condition is a convenient channel from the Bay of San Francisco to and along the city front 300 feet in width and 14 feet in depth at low water, admitting vessels at high water of 19 feet draft.

The channel in the upper bay is 200 feet wide and 8 feet deep at low water. The depths have been well maintained during the year.

Along the front of the city of Oakland the channel was widened during the past year from 225 to 300 feet, and this strip of 75 feet width was excavated to 18 feet at low water. This is an advantage for convenience of navigation.

The channel in the upper bay has been increased in depth and the general facilities for commerce and navigation have been enlarged.

Each year shows the benefit of improvements in the entry of larger vessels.

The other operations of the year, namely, the excavation of a portion of the canal and the addition to the south jetty, are in continuation of the project, but have no immediate bearing upon commercial facilities.

The amount expended to June 30, 1893, is $1,551,644.14.

The quantity of dredging during the year is 418,732 cubic yards, of which 102,441 yards applied to the excavation of the canal, completing the contract; 155,119 yards to widening and deepening the channel in front of the wharves of Oakland, completing the contract; and 161,172 yards to excavation of the upper channel in front of Brooklyn, contract nearly completed. All of the spoil was securely placed ashore.

A contract made on October 8, 1892, for giving 20 feet depth in front of Oakland, not yet begun, is to be completed during the spring of 1894.

The quantity of work done on the south jetty is included in 7,676 tons of stone delivered and in 20,684 square feet of dry masonry. The contract is not yet half finished.

The contemplated operations for the coming year include deepening the channel in front of Oakland, already provided for by contract; in enlarging the channel of the entrance, in extension of the south jetty, and in case of sufficient funds becoming available, a continuation of work upon the canal.

It is estimated that $481,000 will be required to complete the existing project, and that $350,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Year.	Traffic by steam ferries.				Traffic by vessels.		
	No.	Trips.	Passengers.	Freight.	Number.	Register.	Freight.
				Tons.		*Tons.*	*Tons.*
1874	1	600	None.	60,000	1415	70,750	94,300
1878	3	5,400	216,240	129,000	1085	109,125	211,627
1881	3	3,800	858,352	1,051,788	1129	129,714	173,448
1882	3	9,400	892,210	1,150,379	1004	144,004	257,614
1883	3	8,000	974,901	1,142,918	1031	143,886	215,829
1884	3	8,000	1,553,769	1,202,230	1156	163,553	255,738
1885	3	6,000	444,142	1,439,134	1326	200,226	305,437
1886	3	6,000	318,402	1,487,924	1673	188,974	264,050
1887	3	8,520	210,423	1,654,451	1224	130,913	231,660
1888	3	8,520	200,000	1,876,635	1384	162,957	295,932
1889	3	8,600	100,009	1,755,247	1745	185,358	338,123
1890	3	8,600	100,000	1,925,957	2153	213,971	393,478
1891	3	8,600	100,000	2,259,086	2310	232,706	437,923
1892	3	8,600	96,000	2,202,170	2277	223,148	443,011

The freight carried by ferry steamers represents miscellaneous articles of merchandise transferred from the Southern Pacific Railroad to the city of San Francisco and includes most of the railroad traffic of that city.

HARBOR AT SAN DIEGO, CAL.

This harbor is about 500 miles south of San Francisco and within about 12 miles from the Mexican border. It is a magnificent harbor, ample in area and depth of water for the great commerce which it is destined to receive.

Before the adoption of the present project the work carried on at San Diego had for its object the preservation of the harbor, which was being injured by the deposition of material brought down the San Diego River in flood stages. The river was diverted from its course

and caused to empty into False Bay. This was accomplished by building a substantial levee across the mouth of the river and excavating a new waterway leading to False Bay. This work was completed in 1876.

The present project for the improvement of the harbor contemplates the preservation and repair of the above levee, securing a depth of 26 feet at mean low tide over the outer bar by the construction of a jetty 7,500 feet in length on Zuninga Shoals and dredging and maintaining a channel of 24 feet depth at mean low tide over the shoal at the head of the middle ground.

The ground on Coronado North Island needed, in connection with the construction of the jetty, was recently purchased. Upon the acquisition of the land specifications were issued and proposals invited for the construction of so much of the jetty as the available funds would permit.

During the coming season work will be continued upon the construction of the jetty.

The dredged channel through the middle ground has shoaled over a narrow crest to a depth of about 16½ feet at mean low water. This shoaling is due to natural causes, the material being brought into the harbor over Zuninga Shoals during flood stages of tide. With the construction of the jetty this movement of sand will be controlled and the material will be impounded behind the jetty. It is not intended to continue operations at the middle ground until the jetty shall have been extended sufficiently far to permit the dredging to be carried on and a permanent channel maintained.

The total amount of expenditures since 1875, including outstanding liabilities, is $103,808.27.

It is estimated that $284,000 will be required to complete the existing project, and that $200,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Year the improvement began.

	Vessels.	Freight.
	No.	*Tons.*
Entered	201	24,809
Cleared	195	11,647

The vessels (including 109 steamers) had an aggregate tonnage of 122,311 tons.

Year ending December 31, 1892.

	Incoming.	Outgoing.
Vessels:		
Steam, number	279	276
Sailing, do	107	96
Total	386	372
Tonnage	268,014	257,149
Draft, greatest, feet	24½	
Merchandise, general, foreign* valued at	$217,409.45	$92,093.00
Merchandise, general, domestic, tons	19,484	5,449
Coal, do	82,792	
Lumber, feet	16,106,000	
Passengers	5,402	6,012

* No record is kept of the amount in tons exported or imported.

Amount of revenue collected at the port during the year ending December 31, 1892, $89,910.61.

Total amount of freight entered and cleared in 1876	tons..	36,456
Total amount of freight entered and cleared in 1892, exclusive of foreign merchandise	do....	130,063
Increase		93,607

HARBOR AT SAN LUIS OBISPO, CAL.

This harbor is about half way between Wilmington and San Francisco Harbors. It is naturally well sheltered from the west around by north to the east. For the greater part of the year the harbor is a good one and it is only during the winter months, when the prevailing winds are more or less from the southward, that the anchorage becomes exposed to storms from that quarter. The sunken reef that extends out from Point San Luis serves as some protection against the swells from the southward and westward.

The project for this improvement is intended to protect the anchorage and landing at Port Harford by the construction of a breakwater on Whaler Reef, extending from Point San Luis to Whaler Island, and thence to a point where the outer reef rises above high water. The total length of the structure, when completed, including the island, will be about 2,300 feet.

That portion of the breakwater between the point and the island, about 300 feet in length, is practically completed, and work has been commenced upon the extension beyond the island and carried an additional length of 340 feet. In addition, several thousand tons have been deposited in the deeper portions of the reef, on the line of the structure outside. The present completed length of breakwater is about 900 feet.

Work has been in progress during the last fiscal year. The completion of contracts, now existing will result in giving the breakwater an additional length of about 400 feet.

As the breakwater advances seaward the depth of water on the reef on the line of the structure becomes greater, reaching finally 30 feet at mean low water.

The original project contemplated first filling up the gaps in the reef and raising the breakwater to the plane of mean low water, and afterwards raising it higher, if deemed advisable. The conditions arising, from the almost constant swell across the reef, making it difficult and dangerous to deposit rock from barges direct upon the reef, as well as the increased expense of these operations, caused the officer in charge to recommend that the project be changed so as to permit the breakwater to be built continuously above high water as the work proceeded, the material being deposited in place from trestle work built from the shore. A revised project with estimate to carry on the work in this manner was submitted and approved.

The total amount appropriated for this improvement is $95,000, and the total amount expended is $66,864.90.

It is estimated that $508,660 will be required to complete the existing project and that $15,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

	Year the improvement began (1888).		Year ending December 31, 1892.	
	Incoming.	Outgoing.	Incoming.	Outgoing.
Vessels:				
Steam.....number..	603	603	436	436
Sailing .....do....	34	34	18	18
Total	637	637	454	454
Tonnage.....	452, 149. 34	452, 149. 34	285, 100	285, 100
Draft, greatest .....feet..	18	.....	21	21
Merchandise, general.....do....	8, 802	5, 669	8, 264. 6	2, 899. 9
Coal.....do....	2, 985	.....	459. 8	.....
Lumber .....do....	8, 884, 400	.....	3, 850, 100	.....
Grain.....do....	.....	23, 305	2. 9	18. 942. 9
Bituminous rock .....do....	.....	15, 342	.....	15, 644
Dairy produce.....do....	.....	.....	6. 1	1, 458. 2
Live stock.....do....	.....	.....	27. 3	3, 680. 1
Hides and pelts .....do....	.....	.....	.....	90. 2
Asphaltum.....do....	.....	.....	.....	213. 3
Agricultural implements.....do....	.....	.....	78. 7	10. 7

Statistics for both years furnished by the Pacific Coast Railway.

Total amount of freight entered and cleared in 1888 .....tons..	68, 425
Total amount of freight entered and cleared in 1892 .....do....	57, 118. 7

ENTRANCE AND HARBOR AT COOS BAY, OREGON.

Coos Bay is the largest, best, and most important harbor on the Oregon coast south of the Columbia. Before improvements were begun the entrance was obstructed by an outer bar of shifting sand and by inner shoals formed by sand at seasons of the year when the northwesterly winds prevail. Under the action of these winds the spit on the north side advanced toward the south, contracting the navigable passage and usually making the outer channel follow a long and tortuous course. The channel has at times broken through the north spit, and was then direct, the depth of water was greatest, and vessels could enter or go out without trouble.

The project adopted in 1879 provided for the construction of a stone and wood jetty at an estimated cost of $600,000, the object of which being to prevent extension of the north spit, and to open and maintain a deeper and more direct channel across the bar.

The present project is to build two high-tide stone jetties, one from Coos Head and one from the south end of the north spit, extending out toward the bar and leaving an entrance about 1,500 feet wide. The project also includes the protection of the north spit by plantations, to prevent sand from blowing into the harbor. The estimated cost of these works is $2,466,412.20.

The total expenditure prior to June 30, 1892, was $332,001.91, of which $210,337.74 was upon the old project, $121,664.17 upon the new.

The north jetty had been built to a length of 4,800 feet, of which 1,808 was beyond low-water mark. As a result due to this, and probably to other causes, there was a marked improvement in the entrance channel, the depth being 18 to 21 feet at low water. This exceptional result may be explained by the fact that the jetty cut off a swash channel across the north split, thus throwing a large additional amount of water into the main channel.

During the fiscal year ending June 30, 1893, the amount expended was $92,780.19. The jetty tramway has been extended to a total length of 8,768 feet, a vast amount of sand has been impounded by the jetty,

and a minimum depth of 12 feet at low water has been maintained over the bar.

There has been appropriated for the improvement of this harbor up to June 30, 1893, $548,750. It is estimated that $2,131,412.20 will be required to complete the existing project and that $500,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS, FISCAL YEAR ENDING JUNE 30, 1893.

Arrivals and departures of vessels.

	Number.	Aggregate tonnage.
Arrivals	216	57,542
Departures	214	56,751
Total	430	114,293

Vessel built, passenger steamer *Blanco* (launched March, 1893)	net tons..	35
Number of passengers arrived by sea		1,215
Number of passengers departed by sea		1,210
Total exports (tons, 100,919.5)		$992,279.90
Total imports (tons, 9,125)		$502,300.00

HARBOR AT YAQUINA BAY, OREGON.

Yaquina Bay is a narrow estuary some 20 miles long. The channel discharges into the ocean over a bar underlaid by rock, the average elevation of which is about 22 feet below low-water level. About a quarter of a mile in front of the outer edge of the bar is a reef of rocks extending nearly north and south, which acts as a breakwater, protecting the entrance somewhat.

Before improvement the prevailing depths over the bar at low water were from 7 feet to 8 feet. Three distinct channels existed, constantly changing in position and depth. The south channel was the one mostly used, though rendered dangerous by rock. The middle channel, being usually the shoalest, was little used, though free from rocks, while the north channel, long, tortuous, and studded with rocks, was considered unnavigable.

The project adopted in 1881 was to construct a stone jetty on the south side, in order to cause the south channel to shoal up, and obtain a least high-water depth of 17 feet in the middle channel. The jetty was to be 2 feet above mean low water, and was to run out to sea a distance of 2,500 feet from low-water line. The stone was to be deposited from barges, and cribs were to be used if possible. Both were found impossible, owing to roughness of water, and the jetty had to be built from a tramway begun at high-tide level, making the projected length 3,700 feet.

In 1884 the jetty was extended 316 feet shoreward to close a washout, thus making its length about 4,000 feet.

The present project, adopted in 1888, is to raise the south jetty to full high water without further extension, and to build a mid-tide jetty on the north side about 2,300 feet long from the north head to a point opposite the end of the south jetty and about 1,000 feet from it. This project was modified during the past year to the extent of raising the north jetty to full high tide and building five groins from the south jetty towards the channel.

The amount expended up to June 30, 1892, was $535,348.26. The results were highly satisfactory. A low-water depth of 12 to 15 feet was maintained over the bar.

During the fiscal year ending June 30, 1893, $65,501.58 was expended. A minimum bar depth of 14 feet at low water was maintained during the year. A new complication, however, has arisen in the formation of an inner bar 2,000 feet inside the entrance.

Total appropriations to June 30, 1893, amount to $635,000.

It is estimated that $120,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

	Number.	Aggregate tonnage.
Steam and sail arrivals	65	26,392.69
Steam and sail departures	63	25,625.82
Total	128	52,018.51

Estimated value:

Total exports (tons, 17,901.3)	$593,580
Total imports (tons, 6,581)	370,828

The number of passengers arriving by sea was 474; the number of passengers departing by sea was 481.

TILLAMOOK BAY, OREGON.

Tillamook Bay is situated about 50 miles south of the entrance to the Columbia River, and at high tide is about 7 miles long and 2½ miles wide; at low tide it is a great sand and mud flat cut by three channels, the north, middle, and south channels.

The South channel is unimportant, being shoal and not used for purposes of navigation.

The middle channel is the through channel, by which access is had to the head of the bay and to Tillamook City, the principal town of the locality, which is situated on Hoquarton Slough.

The north channel runs along the north shore of the bay from the entrance to Shell Point, about a mile above Bay City, where it terminates.

Tillamook Bay and Bar was first examined in 1886 by Lieut. Edward Burr, under directions of Capt. C. F. Powell. In 1887 a survey was made of the interior waters under direction of Capt. Powell, who in 1888 submitted a project and estimate for work to be done.

The river and harbor act of August 11, 1888, appropriated $5,200 for Tillamook Bay and Bar, and this money was expended in making a survey of the bar entrance and building a dike and revetment work, for the improvement of Dry Stocking Bar, in Hoquarton Slough, and also in removing snags and overhanging trees from Hoquarton Slough.

The river and harbor act of 1890 appropriated $500 for completing the improvement originally proposed, and also provided for a survey of the bay.

The existing and approved project is to make a navigable pass from the north to the middle channel, so that boats can go to points on the north shore, and thence right on up to the head of the bay; to build a dike to deflect the waters from the south to the middle channel at Junction Bar, and to improve Hoquarton Slough by closing up one of the two channels at Dry Stocking Bar. The estimated cost of the work approved is $100,000. The expenditure up to June 30, 1892, was $4,922.95.

No work was done beyond making a survey of the bay and bar. The amount expended during the fiscal year ending June 30, 1893, was $363.34. No work under the project was done and no results obtained.

Total appropriations to June 30, 1893, amount to $20,700.

It is estimated that $85,000 will be required to complete the existing project, and that $50,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels.

Name and description.	Number of trips.	Registered tonnage.	Draft, loaded.
			Ft. In.
Steam schooners:			
Augusta*	22	87	7 9
R. P. Elmore*	(†)	42.76	7 6
Truckee *	15	350	13 6
Homer	2	420	14
Scotia	2	200	11 4
South Coast	4	.....	.....
W. H. Harrison	3	56.86	6 9
Polar Bear	1	.....	.....

* Vessels plying regularly to and from the port. †Not known.

Aggregate tonnage of arrivals and departures	15,175.40
Total exports (tons, 16,402)	$113,894
Total imports (tons, 1,914)	$95,700

The tug *General Garfield*, 10 tons register and drawing 5 feet of water, does a local business upon the waters of the bay and tributaries, towing logs and carrying freight and passengers. She ascends as far as tide water extends. Freight and passengers are also transported to points on the bay and tributaries by sailboats.

GRAYS HARBOR AND CHEHALIS RIVER, WASH.

Grays Harbor is in Chehalis County, Wash., 50 miles north of the mouth of the Columbia. It has lately been made a port of entry in the collection district of Puget Sound.

The harbor has a length of about 14 miles from east to west and a breadth of 12 miles from north to south. There are two main channels traversing the harbor from the entrance to the mouth of the Chehalis River, and are known as the North and South channels. The South Channel is used only by local craft plying on the harbor and river. The North Channel is used by all ocean-going craft entering the harbor. There are two shoals on the North Channel which are obstacles to navigation; one is situated about 2½ miles below Hoquiam and the other one about 1 mile above Hoquiam. Each of these shoals has a ruling depth of 8 feet at mean low water. All lumber-laden vessels leaving the harbor have to be towed across either one or both of these shoals at high water; consequently, they do not reach the entrance in time to cross over the bar the same day, which delay is quite frequently the cause of vessels having to remain in harbor for days at a time on account of storms arising in the meantime and making the bar too rough to cross over. Vessels laden with lumber to 16 feet draft is a common occurrence on the harbor, so it will be seen that it takes more than an average tide to let them pass over the shoals, the average rise of the tide being 7 feet.

The Chehalis River has its source in the hills and mountains of the Coast and Cascade ranges. It has a length of about 100 miles, and falls into Grays Harbor. The Chehalis is at present navigated as far as Montesano, a distance of 15 miles from its mouth.

Montesano is the county seat of Chehalis County, and has a population of 1,500. It is also the terminus of the Puget Sound and Grays Harbor Railroad.

There are four shoals on the river between Montesano and the mouth, having a ruling depth of about 5 feet on them at extreme low water.

In 1880 the population of the entire county did not exceed 573. In 1890 the census gives it as 9,269, two-thirds of the increase being found in the towns immediately on the harbor, Montesano, Cosmopolis, Aberdeen, Hoquiam, and Grays Harbor city, all built almost entirely within the last four years.

In 1880 the assessed value of all property was $1,803,764; in 1889, $2,303,544; in 1890, $6,200,000.

The plan of improvement, submitted in 1891 to comply with requirements of the river and harbor act approved September 19, 1890, is to remove the shoals from the river by dredging and closing side sloughs and channels, so as to give a depth of 16 feet at half tide; to build dikes of pile, brush, and stone in the harbor, wholly closing the middle channel, and closing the South Channel, with the exception of a gap 1,000 feet wide and about 8 feet deep, with a view to increasing the tidal flow through the North Channel and scouring away the bars. The estimated cost was $150,000.

The first appropriation for the work, $50,000, was made by act of July 13, 1892.

The amount expended during the fiscal year ending June 30, 1893, was $5,672.97. The works were but fairly started, and have not as yet had any appreciable effect.

It is estimated that $100,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Vessels arrived and cleared.—The number of vessels of all descriptions crossing in over the bar during the year was 262; the number crossing out was 260. Of the clearances, 138 carried lumber.

EXPORTS.

Articles.	Quantity.	Value.	Remarks.
Lumber, feet, B. M.	89,400,000	.....	Vessel shipments.
Lumber, tons	178,800	$894,000	Vessel shipments.
Salmon (canned), do	456	94,460	Do.
Fruit, hides, and laths, do	.....	.....	No record kept.
Shingles, do	28,650	100,275	Rail shipments.
Lumber, feet, B. M.	8,620,000	115,508	Do.
Lumber, tons	17,240		
General merchandise, feed, etc., hay and potatoes, do	90	1,500	Do.
Total, do	225,236	1,205,743	

IMPORTS.

Machinery, pig iron, hay, feed, live stock, and merchandise, tons	73,000	$3,226,000	No record kept of separate shipments.

SUMMARY.

	Tons.	Value.
Total exports	225,236	$1,205,743
Total imports	73,000	3,226,000

HARBOR AT OLYMPIA, WASH.

Olympia, the capital of the State of Washington, is situated near the head of Budds Inlet, which at this point is about 2,000 feet wide. At Olympia, and for about 4,000 feet below, the inlet is a tide flat, mostly bare at low water. The general range of the tides is about 18 to 20 feet. At high water boats can go up to Fourth street bridge, but at low water they are compelled to land passengers and freight at the end of the long wharf about 1 mile from the city. It takes something over quarter tide for the stern-wheel steamers to reach Fourth street bridge. There is a wharf piled out over the tide land for over a mile, but even that distance does not reach water deep enough for the class of steamers that come to Olympia.

The city of Olympia has about 5,000 inhabitants, and is growing rapidly. There are 10 companies operating 19 boats on the sound at Olympia. The aggregate tonnage of these is 25,900 tons. The Northern Pacific and Union Pacific companies have completed their respective lines to Olympia, and a large increase in commerce is expected.

It is proposed by the project submitted in 1891, under provisions of river and harbor act approved September 19, 1890, to dredge a channel 250 feet wide and 12 feet deep at mean lower low water, from the heart of the city, at the Fourth street bridge, to deep water in Budds Inlet, at an estimated cost of $275,000.

The first appropriation for the work, $35,000, was made by act of July 13, 1892. With the money now available it is proposed to excavate a channel 125 feet wide and 6 feet deep at lower low water.

The amount expended during the fiscal year ending June 30, 1893, was $2,313.26. The excavation of the reduced channel is well under way.

It is estimated that $240,000 will be required to complete the existing project, and that $150,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The following returns relative to the commerce of Olympia Harbor, Washington, are furnished by Mr. E. C. Macdonald, secretary of Olympia Board of Trade, and are for the fiscal year ending June 30, 1893:

EXPORTS.*

Articles.		Quantity.	Value.	Remarks.
Logs	feet, B. M.	6,000,000	$36,000	
	tons	12,000		
Lumber	feet, B. M.	9,000,000	108,000	
	tons	18,000		
Oysters	do	1,150	70,000	
Clams	do	275	10,000	
Dressed meat	do	250	35,000	
Vegetables	do	500	10,000	
Fruit and berries	do	3,000	150,000	
Ice	do	10	200	
Brooms	do	6	1,125	
General merchandise, etc	do	1,850	130,000	Including hardware.
Hay and grain	do	1,000	15,000	
Iron work	do	20	2,000	
Cigars	boxes	2,000	3,000	
Soda and mineral water		.....	2,500	Quantity unknown.
Liquors and wines		.....	5,000	Do.
Miscellaneous, including farm implements, harness, furniture, live stock, and stationery from State printing office	tons	1,450	100,000	
Sash, doors, frames, etc		.....	15,000	Do.
Total	tons	41,011	692,825	

*By water.

IMPORTS.

Articles.	Quantity.	Value.	Remarks.
Logs ..... feet, B. M..	25,020,000	$150,000	For local mills.
Logs ..... tons ..	50,000		
Coal ..... do....	4,000	20,000	
General merchandise	.....	1,225,000	Of all descriptions. Quantity unknown.
Total.....	54,000	1,395,000	

In a communication accompanying these returns Mr. Macdonald further states:

"I might add that by reason of the inadequate shipping facilities (which will be overcome by the dredging of the harbor) a large portion of our shipping is done over the railroads. As soon as our harbor is improved this commerce will again take its usual course and be transported by water."

BAGADUCE RIVER, MAINE.

Bagaduce River is a tidal-water opening into Penobscot Bay at Castine. The lower part or mouth of the river forms the harbor of Castine, where the mean rise of the tide is 9.3.

About 5 miles above the mouth of the river is a place known as the "narrows," though even here the banks are 700 feet apart, and the channel for the largest vessels is more than half that width.

Immediately above the "narrows" the river is much broader, and divides into the North and South Forks. The tidal portion of the North Fork terminates in the Northern Bay, while that of the South Fork passes through the South Bay, and thence in a tortuous channel through various "narrows" and broad places to the village of Brooksville, a distance of about 8 miles. The river between Penobscot and Brooksville consists of the two forks mentioned, a total distance by the channel of about 11 miles.

From the "narrows" to Penobscot the North Fork is broad and has a good channel, though somewhat indirect, as far as Bridges Point. This point is on the east shore, where the river widens into Northern Bay, about 3 miles from the "narrows," and a little more than three-fourths of a mile below the head of the channel at Penobscot.

Above Bridges Point, in the Northern Bay, the channel is narrow, and at low water has not sufficient depth for even the smaller coasting vessels which carry freight to distant points. Even this small channel is greatly obstructed by points of ledge and by bowlders where it passes between Winslow Island and the main land.

The ledge and bowlders mentioned form such an obstruction that vessels are compelled to leave the channel entirely and pass over the flats on the other side of the island; this can only be done at high water and with vessels of comparatively small draft. Any regular or reliable communications by water are, therefore, at present impracticable, though the shipments by water from this point are sufficient to make freights for 210 vessels, many of them so large that they have to be loaded below Bridges Point, at great additional expense.

Bagaduce River is the only outlet, except by wagon road, for a large section of country, and its improvement will be a great benefit, fully justifying the small expenditure which will be required. The project of improvement adopted is to obtain by dredging and blasting a nearly straight channel, 100 feet wide and 6 feet deep at low water, from the wharf at South Penobscot to deep water at Bridges Point.

A project for the improvement of the Northern Bay was adopted in 1890, which has for its object the securing of a channel 100 feet wide

and 6 feet deep at mean low water from Bridges Point to Bowdens Wharf, at an estimated cost of $45,000. A small quantity of rock will also have to be removed at a cost of $1,875.

The total amount appropriated to date is $12,000.

The expenditures to the close of the fiscal year ending June 30, 1892, amounted to $100, which were for the preparation of plans, etc. No work had been done, the amount available at that date not being sufficient to accomplish enough to be of any material benefit.

The expenditures during the year ending June 30, 1893, were $119.72, making the total expenditures $219.72. A contract was made in January, 1893, for the dredging of a channel 6 feet deep at mean low tide, and 40 feet wide, from Bridges Point to Bowdens Wharf, removing all material except ledge.

The amount (estimated) required to complete the existing project is $34,875. Amount that can be profitably expended in fiscal year ending June 30, 1895, $25,000.

COMMERCIAL STATISTICS.

Receipts and shipments.

Articles.	1891.	1892.	Articles.	1891.	1892.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Bricks	6,000	7,500	Ice	150	200
Coal	2,200	2,350	Lumber	2,800	3,500
Cotton	150	150	Lime, cement, etc	300	400
Farm produce	250	300	Wood	6,000	5,400
Fish	150	300			
Grain	8,000	9,000	Total	41,300	46,100
General merchandise	15,300	17,000			

Most of the above is landed and shipped from Castine, at the mouth of the river.

KENNEBEC RIVER, MAINE.

The Kennebec River is one of the largest highways of commerce in New England, and forms one of the principal water communications from the seaboard to the interior of the State. No other equal area in the country has so extensive a business in the cutting and shipment of ice; this is an annual crop, which practically costs nothing save labor to produce, so that the total receipts are a net benefit to the State, and it decreases the cost of this luxury in nearly every State on our Atlantic and Gulf coast. Exports of granite and lumber figure to a considerable extent, as well as numerous other articles of smaller merchandise.

Two regular lines of steamers ply upon the river as far as Augusta, one line running from Boston. The latter, however, is compelled to transfer its passengers and freight to a smaller steamer at Gardiner. With a good channel, steamers would without doubt run direct from Augusta to Boston.

The navigation of the river has been much obstructed by shoals from Augusta to Gardiner and a few points below; also by a ledge of rock at Lovejoy Narrows.

The total amount spent on improvements up to June 30, 1893, was $310,208.39.

The total amount estimated for the entire improvement is $428,500. The amount appropriated up to now is $395,350.

In August, 1892, the project was revised, and it was intended to secure a channel 13 feet deep up as far as Sands Islands, 12 feet from thence to Hinckley Shoal, and 10 feet from thence to Augusta; a steamboat channel 9 feet deep west of Swan Island, and to remove old bridge piers at Hallowell; the above depths at mean low tide.

This project was estimated to cost $388,500.

The channel has been improved near Beef Rock to a great extent; it now has a clear depth of over 12 feet, the dangerous rocks in Lovejoy have been removed to a depth of 12 feet, and the channel straightened, the shoal at South Gardiner deepened to 10 feet, and the ledge at Nehumkeg removed to 12 feet, the steamboat channel west of Swan Island deepened to 9 feet, and at the head to 10 feet, between Gardiner and Augusta, the channel deepened to 7 feet, between Gardiner and Hallowell, and to 6½ feet between Hallowell and Augusta, and the piers of the bridge at Hallowell removed.

Navigation has been greatly bettered.

The work was going on at the last report of the engineer.

July 1, 1893, balance available, $16,513.69; amount (estimated) required for completion of existing project, $163,500; amount that can be profitably expended in fiscal year ending June 30, 1895, $100,000.

In 1891 the receipts and shipments were 1,210,474 tons; in 1892, 1,263,145 tons, an increase of 52,671 tons.

NARRAGAUGUS RIVER, MAINE.

The Narragaugus River proper is a small stream flowing across the southwestern portion of Washington County, but the navigable part of the river comprised in the project for improvement is really a tidal arm of the sea or Narragaugus Bay, below the town of Millbridge.

The towns of Cherryfield and Millbridge, in Washington County, Me., are situated on the Narragaugus River, the one at the head of navigation, about 10½ miles from the mouth of the river, and the other about 3½ miles from the same point. Both towns are largely engaged in lumbering, several large sawmills being in operation at each place, while at Millbridge vessels of the larger class are built, at three different shipyards. Millbridge is naturally the shipping point for a number of neighboring towns engaged in the manufacture of lumber and the canning of fish and lobsters, an industry largely followed in this locality of the State. It is a touching point of the Portland, Bangor, Mount Desert and Machias Steamboat Company, but by reason of the low depth of water in the river these steamers are compelled, except at extreme high water, to take on and discharge their heavy freight for this place in the lower bay, and transfer passengers and freights to a lighter, at great expense and loss of time.

The navigation of the river from Millbridge to Cherryfield has been much improved and now vessels of light draft can run to Cherryfield without any transfer.

The improvement of the river below Millbridge was to dredge a channel not less than 200 feet wide from deep water in the bay to "Deep Hole," an anchorage for vessels in bad weather, with a depth of 11 feet at mean low tide as far up as Long Point and thence to Deep Hole 9 feet. The mean range of the tides is 11.2 feet.

In June, 1892, an 11-foot channel had been dredged from deep water in the bay in toward the new steamboat wharf, 90 feet wide; with space in front of the wharf 300 feet wide.

Twenty-seven thousand five hundred and forty-three dollars and seventy-four cents has been spent on the second project; there is now unexpended $7,456.28.

Amount estimated to complete the project, $15,000. Amount that can be expended in year ending June, 1895, $15,000. No work has been done during the year. Proposals for dredging were opened during the year, but were rejected as too high.

COMMERCIAL STATISTICS.

Receipts and shipments.

Articles.	1890.	1891.	1892.	Articles.	1890.	1891.	1892.
	Tons.	*Tons.*	*Tons.*		*Tons.*	*Tons.*	*Tons.*
Coal	.....	1,200	2,000	Lumber	41,500	38,077	30,000
Fish and salt	.....	1,582	.....	Miscellaneous	22,500	4,725	7,000
Hides and leather	750	675	.....	Stone and silica	2,000	2,500	4,500
Hay	.....	.....	300				
Hardware and iron	.....	200	1,500	Total	66,500	48,959	45,300

There arrived during the calendar year 1892: Steamers, coastwise, tonnage, 155,000; average draft, 8 feet. Sailing vessels, coastwise, tonnage, 12,500; average draft, 9 feet; vessels for refuge only, 250.

SACO RIVER, MAINE.

The project for improving the Saco River includes the contraction works, removal of ledge, and dredging, considered necessary to give a channel having not less than 6 feet depth at low water from the sea to the cities of Saco and Biddeford.

The project also includes the breakwater, which had been treated as a separate work until the act of September 19, 1890, which included both the river and breakwater in one appropriation.

The present project for this latter improvement consists in repairing and completing the old breakwater, so that it shall have a height of 15 feet above low water and a width of 12 feet on top.

The breakwater has now been raised to its full height a distance of 2,320 feet from the end, and partially raised a farther distance of 28 feet.

The jetty and wall at Little Islands, 750 feet long, has been completed, and the contraction of the channel at that place has caused a very satisfactory scour of the sand, so that the channel is much improved.

The effect of this jetty has been so great in moving the sand that should a deeper channel be required than is now given over the ledge between the islands, it is very evident that it may be easily obtained outside the islands merely by contracting the width. It has been ascertained that the obstruction there is all loose sand. Part of the wing dam has been built at Cow Island. The channel has also been dredged in places, and much improved, but the removal of the bar at the mouth is essential to the use of vessels of greater draft.

The jetty opposite the breakwater is considered much the most important part of the improvement at present. The project for work under the last appropriation has therefore been limited to the jetty and to small spurs should they be required.

The amount constructed thus far is insufficient to cause any radical effect.

The navigation on the river varies from year to year. In the last year the tonnage statistics were less than the year previous. Probably the mean tonnage for the two years would fairly represent the average.

Amount (estimated) required for completion of existing project, $72,500; amount that can be profitably expended during fiscal year ending June 30, 1895, $50,000. The total amount expended up to June 30, 1893, was $291,697.29.

In 1891 the commerce was 49,765 tons; in 1892 it was 47,108 tons.

BELLAMY RIVER, NEW HAMPSHIRE.

The Bellamy River is a small tidal branch of the Piscataqua River, with which it connects at Dover Point, 4½ miles above Portsmouth, N. H. The tidal water extends to "Sawyers," a suburb of the city of Dover. There are extensive deposits of clay along the banks of the river, and the manufacture of bricks is a flourishing industry. Three establishments are now turning out between 2,000,000 and 3,000,000 annually. This industry will be greatly stimulated by the improvement of the river, which will reduce the costs of freights (it is estimated) 50 cents per 1,000 bricks.

At low water the channel of the river was too shallow for any navigation, save for a short distance. The entire distance over which improvements are required is 13,300 feet, a little more than 2½ miles. The project of the improvement consists simply in dredging the present natural channel sufficiently to give a mean low-water depth of 3 feet and a width of 50 feet on the bottom. The depth at mean high water will be nearly 12 feet.

The improvement commences at a point about 2 miles from the Piscataqua River.

Twenty-seven thousand five hundred dollars has been appropriated for this improvement.

The entire estimated cost was but $28,000, and it is probable that had the entire amount been appropriated in a single sum the consequent reduction in price and in contingent expenses would have been sufficient to offset the increased measurements of material.

One mile has been added to the navigable part of the river.

The expenditures up to June 30, 1893, amount to $19,681.61, leaving a balance of $7,818.39 unexpended. To complete the existing project the estimate is $7,500, and this amount can be profitably expended during the fiscal year ending June 30, 1895.

COCHECO RIVER, NEW HAMPSHIRE.

The Cocheco River unites with the Salmon Falls River about 3 miles below Dover, N. H., and thus forms the Piscataqua River, which flows along the southern part of boundary between Maine and New Hampshire. The mean range of tides on the river at Dover is about 6¾ feet. Though under a different name, the river really forms a part of the Piscataqua, the head of navigation being at Dover, about 13 miles above Portsmouth and nearly 17 miles from the open water of the Atlantic Ocean.

The present channel is but 5 feet deep and has a width of but 40 feet in the narrowest places.

Under the provisions of the river and harbor act of August 11, 1888, an examination and survey of the river was made from Dover to its confluence with the Salmon Falls River, where the two form the Piscataqua.

The officer in charge of the work submitted a project for improving the river to give a depth of 7 feet at mean low water and a minimum width of 50 feet. The estimated cost is $175,000.

The general depth of 7 feet was determined upon partially with reference to the condition of the Piscataqua River below the mouth of the Cocheco, where there are said to be several shoals, with a little less than 8 feet of water over them at mean low tide.

Above the lower narrows the river is generally narrow and the character of the material such that the proposed channel when once obtained will maintain itself. Below the narrows, however, as the river widens and the material is mostly sand and mud, a few contraction works are regarded as necessary for the maintenance of the desired channel. For this purpose five jetties with training walls are proposed. They are to be of rough stone upon foundations of brush fascines, the tops to be 6 feet wide, and to be in a plane midway between mean high and mean low water levels.

The upper end of the channel at Dover now has a depth of 7 feet at mean low tide for a length of 1,200 feet, and widths from 100 to 140 feet. Above and below Clement's wharf the channel has been dredged to the same depths.

The total expenditures amount to $194,434.

No work has been done the year just ended.

Two hundred and ten thousand dollars has been appropriated for this improvement, and there is now available $15,541.

Amount estimated to complete the existing project, $135,000; amount that can be profitably expended in the year ending June, 1895, $50,000.

The city of Dover, N. H., through which the Cocheco River runs, is one of the largest and most important cities in the State. Its manufacturing industries are numerous and varied.

The Cocheco Manufacturing Company has a capital of $1,500,000. It has five mills, from five to seven stories high, engaged in the manufacture of cotton cloths, of which it turns out 32,000,000 yards per annum. It is connected with the Cocheco Print Works, which prints 40,000,000 yards per annum. Together they use 12,000 bales of cotton per annum, employ 2,000 hands, and have a monthly pay roll of $50,000.

The Sawyer Woolen Mills consume 2,600,000 pounds of wool each year, employ 450 to 500 hands, and produce goods annually of the value of $1,200.000.

The shoe-manufacturing industry of the city is larger than in any other city of the State, employing 1,300 hands, with a monthly pay roll of some $40,000.

There are also numerous small industries of great importance and magnitude in the aggregate. The tonnage in freights is estimated at 40,000 tons.

OTTER CREEK, VERMONT.

The project for this improvement was adopted in 1872, and, as modified in 1882 and 1884, proposes the formation of a channel from Vergennes, Vt., to Lake Champlain, of a navigable width, and to afford a least depth of 8 feet.

The original project was adopted in 1872, and was estimated to cost $58,146. In 1882 surveys developed the fact that rock in situ would be encountered within the proposed limits of width and depth and the estimate was increased to $73,748.40. In 1884 a relocation of the channel at Bull Brook Bend avoided part of the rock excavation, reducing the cost by about $500 and the lower prices which have prevailed in recent years, have insured the completion of the project for less than the revised estimate of 1882.

Occasional expenditures for maintenance will doubtless be required. It has been found necessary to repeat operations at Bull Brook Bend, and it is quite probable that accretions will again occur on the shoals there and elsewhere during the season of freshets. Such costs of maintenance will not, it is believed, be excessive in relation to the first cost of the improvement, and they will be very small as compared with the traffic benefited.

Operations under the pending contract will complete the projected channel to a point about 500 feet from its upper terminus. Above this point the channel was dredged to rock during the season of 1891. To complete the project this length must be excavated to the proposed depth of 8 feet below low water. The volume of rock to be taken out is 3,700 cubic yards. In addition to this a large bowlder at Bull Brook Bend should be removed and a cut made through a hard shoal at the mouth of the creek to avoid a very abrupt turn.

Appropriations aggregating $51,500 have been made for this work, which, deducted from the revised estimate of $73,748.40, leaves a balance due the improvement of $22,248.40.

The amount (estimated) required to complete the existing project, $20,000. This amount can be profitably expended in fiscal year ending June 30, 1895.

COMMERCE.

Arrivals and departures of vessels, 1892.

Character of craft.	Arrivals.		Departures.	
	Number.	Tonnage.	Number.	Tonnage.
Unrigged	46	4,460	46	4,460
Steam tugs	176	1,874	169	1,839
Steam vessels	4	976	4	976

Total tons of merchandise arrived and shipped, 1892.

Articles.	Shipped.	Arrived.	Articles.	Shipped.	Arrived.
Coal ..... tons..	.....	3,750	Nails ..... tons..	300	.....
Iron ..... do....	.....	535	Kaolin ..... do....	85	.....
Lumber ..... feet..	.....	1,500,000	General merchandise .do....	55	50
Staves ..... bundles..	7,000	.....			

POWOW RIVER, MASSACHUSETTS.

Powow River is a tributary of the Merrimac River, which it enters from the north about 3½ miles above Newburyport. The tide enters the river a distance of about 9,600 feet, following the channel, or to a dam just above the town of Amesbury, Mass. The present channel is narrow, exceedingly crooked, and is not navigable at low water.

The general project of the improvement of the river was proposed January 24, 1885. This project proposed to make a channel 9,600 feet long, 60 feet wide on the bottom, and 12 feet deep at mean high water, at an estimated cost of $77,000.

Three appropriations have been made for this improvement, viz, by the river and harbor act of August 11, 1888, which appropriated $3,000 for dredging—

Provided, That this sum shall not be expended until the towns of Amesbury and Salisbury, or either of them, shall have caused such a draw to be placed in the present bridge over said river as may be approved by the Secretary of War.

And by the river and harbor act of September 19, 1890, $5,000, with a similar proviso, and by act of July 13, 1892, $4,000.

On April 10, 1889, the Secretary of War approved the plan of the proposed bridge.

The condition required by the proviso in the acts making appropriations for this improvement has been complied with, but the funds available are inadequate to obtain any appreciable benefit to commerce, and they will be retained in the Treasury until additional funds are provided.

To complete the improvement will require an appropriation of $65,000. Of this amount $30,000 could be expended to advantage during the fiscal year ending June 30, 1895.

TAUNTON RIVER, MASSACHUSETTS.

This river rises in Norfolk County, Mass., and empties into Narragansett Bay at Fall River. The object of the improvement is to deepen and widen the channel leading to the city of Taunton, at the head of navigation, so that vessels of 11 feet draft can reach the city at high water.

In its original condition the channel was narrow and obstructed by bowlders, and from Berkley bridge to Taunton the depth was not, in places, more than 5 feet at mean high water. A vessel of 30 tons burden was as large as could go up to Taunton.

From 1870 to 1879 $63,000 was appropriated to secure 9 feet depth at high water. This work was completed in 1879.

The approved project of 1880, as modified in 1888, provides for the widening and deepening of the river so as to secure a channel of at least 12 feet depth at high water with 100 feet width from its mouth up to Berkley bridge (above Dighton), thence 12 feet depth with 80 feet width (100 feet width at bends) up to Briggs Shoal, thence 11 feet depth width 80 feet width up to the shipyard, thence 11 feet depth with 60 feet width up to weir bridge, Taunton.

At the adoption of the present project the channel was limited to 9 feet at high water, and was too narrow and too much obstructed by bowlders for easy navigation by the craft making use of it.

One hundred and eight thousand dollars has been appropriated and $100,976.98 had been expended on this work up to June 30, 1892, by the expenditure of which a large part of the proposed work had been done, especially at the places most complained of by the vessels using this river. Vessels of 11 feet draft could reach Taunton, at the head of navgation.

There remain to complete the existing project the widening and deepening of the channel at a few points and the removal of a small amount of ledge rock. The cost of this work is estimated at $17,000 in addition to the funds on hand at the end of the year.

During the past fiscal year plans have been made for work under the new appropriation, all work to be done by hired labor and the use of the Government plant. The dredging itself was commenced and completed as far as funds allowed, 5,050 cubic yards of dredged material and about 177 tons of bowlders having been removed from the most troublesome parts of the river above Briggs Shoal.

The amount (estimated) required to complete the existing project, $17,000; this entire amount can be profitably expended in fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

Class of goods.	Exports.	Imports.	Total.	Tonnage.
				Tons.
Grain and forage	.....	$1,070,000	$1,070,000	47,000
Cotton and products	.....	1,750,000	1,750,000	8 800
Lumber and products	$75,000	325,000	400,000	21,000
Coal, minerals, and products	200,000	1,760,000	1,960,000	385,000
General merchandise	.....	920,000	920,000	92,000
Total	275,000	5,825,000	6,100,000	471,000

WEYMOUTH RIVER, MASSACHUSETTS.

Weymouth (Fore) River, Massachusetts, tributary to Hingham Bay, Boston Harbor, on the southwest, is one of the most important water courses on the south coast of Massachusetts Bay. It is navigable at low-water mark for vessels not to exceed 18 feet draft 4 miles from its mouth; and for a further distance of 3 miles, to the head of navigation, at least 3 feet depth is found at mean low water.

The original project for its improvement was submitted December 2, 1889. It was based on the survey provided for by the act of August 11, 1888, and proposed to improve the natural channel of the river by dredging, so that 6 feet depth at mean low water can be carried to the head of navigation in a channel 100 feet wide to near the wharves at Weymouth Landing, thence to Braintree Bridge 80 feet wide, and above the bridge 50 feet wide, with increased width at each turn to facilitate the movement of vessels. The total length of channel to be improved is 7,000 feet, approximately, and the cost is estimated to be $40,000.

Twenty thousand dollars has been appropriated to date. The amount estimated to complete the improvement is $20,000, which amount can be profitably expended during the year ending June 30, 1895.

On June 30, 1892, the improved channel was 6 feet deep at mean low tide, 40 feet wide to Braintree bridge, and 25 feet wide thence to the head of navigation. In July, 1892, it was thought best to use the available funds in widening the channel to 60 feet below Braintree bridge and completing it above the bridge.

The bids for this work were considered high and hence rejected.

The commercial statistics are included in those of Boston Harbor.

MYSTIC AND MALDEN RIVERS, MASSACHUSETTS.

The river and harbor act of 1890 required examinations of "Mystic River and the Malden River, a tributary of the Mystic, from the bridge of the Boston and Maine Railroad, eastern division, to the head of navigation on said rivers."

These two rivers diverge just above the eastern railroad bridge. The main river (Mystic) extends westward a distance of about 2½ miles to the head of navigation in the town of Medford. The tributary (Malden) reaches to the northwestward, and is navigable for light-draft vessels to the second bridge in Malden, a distance of about 2 miles from its mouth, with a depth of barely 7 feet at high water.

Immediately above the confluence of these streams the Mystic is crossed by the bridge of the Boston and Maine Railroad, and about 2,000 feet higher by a highway bridge; both bridges have draws suitably located in the thread of the stream. The river is tortuous and

near its head the difficulties of navigation are increased by shoal water, the river bed being bare at low tide for a distance of about 1,500 feet from the Medford street bridge.

The coast survey of this river made in 1861 shows a navigable channel of 6 feet at mean low water to within about a half mile of Medford bridge. Shoaling has taken place since the date of this survey in the lower reach about the bridges and mouth of the Malden, which has interfered lately with navigation; some dredging in this locality to deepen the channel, and in the upper reaches to ease the sharp bends, will very materially aid in developing the commercial interests bordering the river, the business of which for the year 1890 is represented as—

25 lumber vessels	feet..	2,600,000
12 rum and molasses vessels	tons..	3,600
52 coal vessels	do...	19,000
55 stone vessels	do...	60,000

done by firms representing $600,000 invested capital, who say that they would double their business if the river was improved.

The land along the river is well suited to manufacturing purposes and all business needing water transportation, while the towns of Medford and Somerville would be furnished with valuable wharf sites and be benefited greatly by competition of water against rail transportation in their supply of coal and building materials.

The proposed improvement of Mystic River contemplates the enlargement of the natural channel to a width of 100 feet and depth of 6 feet, at mean low water, to the first turn above Dennings Wharf, and thence to the head of navigation to a depth of 4 feet and with a width gradually reduced to 50 feet at Cradock bridge; the cost of this work is estimated at $25,000.

The original project for the improvement of the Malden River proposed to make the natural channel 100 feet wide and 12 feet deep to the first bridge and thence 75 feet wide to the second bridge, at an estimated cost of $40,000.

Ten thousand dollars was appropriated toward this improvement in the river and harbor act of August 2, 1882, and with its expenditure the following season the channel was improved from the mouth to the drawbridge of Malden, a distance of 1¼ miles, to a least width of 50 feet, being 70 feet at turns, and a depth of 12 feet at mean high water. Additional funds were asked for by the local officer in his report for the year 1885 to complete the improvement, and again in 1886.

By the act of July 13, 1892, $10,000 were appropriated for the improvement of Mystic and Malden rivers.

On July 18, 1892, it was recommended that one-half of this amount be retained in the Treasury for the improvement of Malden River (when additional funds are available), and that the balance be expended in improving Mystic River as proposed from its mouth to Dennings wharf.

To complete the improvement of Mystic River would require an appropriation of $20,000, and for Malden River $30,000, a total of $50,000, all of which could be expended to advantage during the fiscal year ending June 30, 1895.

ESSEX RIVER, MASSACHUSETTS.

Essex River winds between marshy banks for 3½ miles from the head of navigation at the village of Essex, to its mouth, which forms a harbor of refuge for light-draft vessels on the Atlantic, about 3 miles

to the southeastward of the entrance to Ipswich Harbor. The channel is very crooked and difficult to navigate by reason of sandbars and bowlders.

The commercial importance of this stream is almost entirely in its shipyards, where it is said nineteen-twentieths of all the fishing vessels of Gloucester and Provincetown are built. During the year 1890, 22 vessels, of an aggregate tonnage of 4,477 tons, were built in the village of Essex, by five distinct firms; and this business has been carried on here for the past fifty years. This industry should be encouraged to the fullest extent; the improvement of the river will add greatly to its prosperity.

The survey made in accordance with the requirements of the river and harbor act of 1890 shows that at least 4 feet depth can be carried in a sufficiently capacious channel from the mouth of the river to a point about 12,000 feet from the head of navigation; and the improvement recommended is to widen and deepen the natural channel of the river, so that 4 feet at mean low water can be carried to the head of navigation, in a channel 60 feet wide.

But one appropriation for this work has been made, viz, by the act of July 13, 1892, $5,000.

On July 18, 1892, it was recommended that the available funds be retained in the Treasury until an additional appropriation is made, for the reason that no appreciable benefit to commerce would result from the expenditure of so small a sum. This recommendation was approved August 4, 1892.

No other operations were in progress during the fiscal year, and at the date of this report the original condition of the river is unaltered.

To complete the improvement will require an appropriation of $20,000, all of which could be expended to advantage during the fiscal year ending June 30, 1895.

PAWTUCKET RIVER, RHODE ISLAND.

The navigable part of the Pawtucket (or Seekonk) River, an arm of Providence River, extends from Providence to Pawtucket, a city which in 1890 had a population of about 28,000 and extensive manufactures depending largely on water transportation. The object of the improvement is to widen and deepen the channel leading to Pawtucket, so that vessels of 12 feet draft can reach that city at mean low water. The mean rise and fall of the tide is about 5 feet.

The channel in the river had originally a ruling depth of about 5 feet at mean low water.

The original project, as modified in 1883, provides for the excavation by dredging of a channel 100 feet wide and 12 feet deep at mean low water from the deep water above Red bridge to the ledge opposite Grant & Co.'s wharf at Pawtucket; thence the deepening by blasting of the channel through the ledge to Pawtucket bridge to the same depth, and 40 feet wide.

One hundred and eighty thousand dollars has been appropriated for the present project.

The total amount expended on the present project (including $482.20 outstanding liabilities) up to June 30, 1892, was $144,777.32, by which the shoalest places had been improved and about nine-tenths of the needed work done, securing a channel of about 12 feet depth with from 40 to 100 feet width (the greater portion being 100 feet wide, up to above the lower wharves of the city of Pawtucket.

This completed portion of the channel had been already a great benefit to the commerce of the river.

During the past fiscal year plans have been made for work under the new appropriation, and contract for dredging entered into, work to be completed April 1, 1894. A minor survey has been made to serve as basis for the coming season's work. No work, except of preparation, has as yet been done in the field.

The work yet to be done is to widen the channel for a short distance at two places and to deepen the channel through the ledge to the same depth with a width of 40 feet.

The balance available ($20,559.89) will be applied to continuing the improvement. Amount (estimated) required for completion of existing project, $202,500. Amount that can be profitably expended in fiscal year ending June 30, 1895, $100,000.

COMMERCIAL STATISTICS.

The commerce arriving and leaving Pawtucket River by water during the calendar year ending December 31, 1892, is estimated as follows (based mainly upon reports received from Mr. George E. Newell, Pawtucket, R. I.):

Class of goods.	Exports.	Imports.	Totals.	Tonnage.
				Tons.
Cotton and products	$125,000	.....	$125,000	620
Fertilizers	22,500	$37,500	60,000	1,600
Lumber and products	185,000	148,000	333,000	16,700
Coal, minerals, and products	70,000	1,096,000	1,166,000	221,000
Total	402,500	1,281,500	1,684,000	249,920

The passage of vessels through this waterway is estimated as follows (each entrance and departure together being counted as one passage):

Steam:		Barges:	
Freight mainly	640	Freight	480
Passenger mainly	300	Sail:	
Tugs	500	Freight	160
Pleasure boats	800	Pleasure boats, small	800

PROVIDENCE RIVER AND NARRAGANSETT BAY, RHODE ISLAND.

Providence River is an estuary of Narragansett Bay. The object of its improvement is to furnish a wide and deep channel for European and coastwise commerce from the ocean to Providence, a city of 133,000 inhabitants, largely engaged in manufactures, and a port of entry for an extensive region of country, with which it is connected by railroads.

Before the improvement of the river was commenced, in 1853, many shoals obstructed navigation, and at one point in the channel, a place called "The Crook," the available low-water depth was but 4½ feet.

From 1852 to 1882 there was an expenditure of $290,459.34 in deepening the channel, first to 9 feet, then to 12 feet, then to 14 feet, and again to 23 feet, as the increasing sizes of vessels and the growing commerce of Providence demanded. Bulkhead Rock was also removed during this period to a depth of 20 feet below mean low water.

The approved project of 1878, modified in 1882, under which the work is now in progress, provides for a channel 25 feet deep and 300 feet wide, suitable for large ocean vessels, extending from Fox Point, in the city of Providence, to the deep water of Narragansett Bay, and for an anchorage basin between Fox and Field points, 300 feet wide, at a

depth of 25 feet; 600 feet wide, at a depth of 20 feet; 725 feet wide, at a depth of 18 feet; 940 feet wide, at a depth of 12 feet; 1 060 feet wide, at a depth of 6 feet.

The amount expended on the present project to June 30, 1892, was $559,950.45, by which all the 25-foot-depth channels, most of the 20-feet depth anchorages, and a part of the 18-foot-depth anchorages had been dredged.

During the past fiscal year plans have been made for work under the new appropriations, and contract for dredging entered into, work to be completed April 1, 1894. The dredging itself has been commenced and 76,421 cubic yards of material has been removed from the anchorage areas just above Sassafras Point.

There is required for the completion of the existing project the remainder of the excavation of the anchorage basin between the head of Sassafras Point Reach and Field Point, and removal of a few shoaled portions of the 25-foot depth channel.

The available funds and appropriation asked for will be used to complete the excavation of the anchorage area.

Sixty-five thousand dollars are required to complete the existing project, and this amount can be profitably expended in the ensuing fiscal year.

The amount of revenue collected at Providence last year was $385,887.01.

COMMERCIAL STATISTICS.

Class of goods.	Imports.	Tonnage.
		Tons.
Lumber and products	$222, 500	31, 200
Coal, minerals, and products	3, 500	870
Machinery and hardware	100	1
General merchandise	13, 700, 000	1, 318, 000
Total	13, 926, 000	1, 350, 000

Character or class of service.	No.	Average draft.	Average tonnage.
		Feet.	*Tons.*
Steam, freight, and passenger	2, 000	18	450
Sail, freight	3, 000	15	150

GREEN JACKET SHOAL, PROVIDENCE RIVER, RHODE ISLAND.

Green Jacket Shoal is in that part of Providence River which constitutes the harbor of Providence. It lies off the wharves on the south front of the city, and occupies a part of the harbor that is required for anchorage purposes. That part of the harbor in which the shoal is located is about 2,000 feet long by from 600 to 1,200 feet wide; and of this area the shoal, or rather that part of it which was included between the 15-foot curves, takes up about 18 acres. There were channels on either side of the shoal, between it and the harbor lines, having, the one on the north side a width of 300 feet and a depth of 20 feet, and the one on the south side a width varying from 50 to 100 feet and a depth of about 15 feet at mean low water. The water on the summit of the shoal was 1 foot deep.

The general project is the removal of the entire shoal to a depth of 25 feet at mean low water, limiting the work by lines drawn 200 feet from the harbor lines.

The major part of the larger class of vessels engaged in the commerce of Providence are from 16 feet to 20 feet draft, and there is a constant tendency to an increase in the size of vessels arriving at this port and a corresponding reduction in the cost of freights. There are several vessels already that draw more than 20 feet, and the number would be larger, but at present there is no anchorage for such vessels, except in such positions that they rest in the mud at low water, or they occupy and obstruct the newly excavated 25-foot channel.

The amount expended, including outstanding liabilities, to June 30, 1892, was $79,237, and the result was the excavation of an area of about 18 acres on the western side of the shoal to a depth of 25 feet at mean low water, making an important addition to the anchorage facilities of Providence Harbor.

During the past fiscal year plans have been made for work under the new appropriation, and contract for dredging was entered into, work to be completed April 1, 1894. No work, except of preparation, has as yet been done in the field.

The balance available will be applied to the continuation of the excavation of the shoal to a depth of 25 feet. Twenty-three thousand and ninety-six dollars will be required to complete the existing project, which amount could be profitably expended during the next fiscal year.

CONNECTICUT RIVER, BELOW HARTFORD, CONN.

The Connecticut River below Hartford is a large stream, for the first 21 miles flowing in a winding course, for the most part through alluvial meadows, which are overflowed at high water, and which consist of a light sandy soil, easily undermined. For the remaining 29 miles, to Long Island Sound, at Saybrook Point, the course is straighter, the banks more permanent, and generally harder. Between Hartford and Long Island Sound, a distance of 50 miles by course of channel, the depth on the bars was formerly 5 feet at low water, the worst places being between Hartford and Middletown, a distance of 19 miles, and at Saybrook Bar, at the mouth of the river.

In 1868 a project for improvement by the United States was submitted, under which a pile dike was built at Hartford, and annual dredging done on the bars below Hartford until 1883. In 1873 a project for the construction of three jetties on Saybrook Bar was adopted; two of these have been built, the third will probably not be required.

In 1880 a project for permanent improvement of six of the worst bars between Hartford and Middletown was adopted; it contemplated building riprap wing dams, rectifying the banks, and protecting the caving banks by mattresses, at a total estimated cost of $330,487. It was afterward found necessary to extend the project to include annual dredging at these and other bars, and the extension and repair of the Saybrook jetties. Two of the contemplated works have been built, a training wall at Hartford Bar and a wing dam at Glastonbury Bar, their total cost being $40,715.34. In addition to the work included in the estimate of $330,487, the east and west jetties at Saybrook have been extended and repaired, and a channel 130 feet wide and 12 feet deep has been dredged between them, and from $5,000 to $10,000 have been annually expended in dredging to maintain a depth of 9 feet on the bars between Hartford and Saybrook.

Experience has shown that on account of the frequency and height of freshets in this river the permanent works projected in 1880 would be inadequate to maintain the desired depth, or even to materially

reduce the amount of dredging annually required, therefore in December, 1887, a new project was adopted, confining future operations to the completion of the Saybrook jetties to a height of 5 feet above high water, with a top width of 6 feet, and widening the channel between the jetties to 400 feet, with a depth of 12 feet at mean low water, at an estimated cost of $80,000, with annual dredging to maintain a 9-foot channel between Hartford and Long Island Sound, at an average cost of $10,000 per year.

In 1890 an extension of the project was adopted to provide for raising the Hartford Dike to about 15 feet above low-water level, at an additional estimated cost of $50,000.

It is believed that the effect of raising the dike will be to considerably reduce the cost of annual maintenance by dredging, and cause less interference with navigation by the occupation of the low-water channel by the dredging plant. Moreover, the revised estimate of $80,000, submitted for completion in 1888, was a reduction in the estimate for works previously proposed of about $290,000.

Future appropriations will be applied to maintenance of the channel, to raising the Hartford Dike and completing the Saybrook jetties, and to widening the channel through Saybrook Bar.

During the fiscal year dredging was done to maintain the navigable channels in the river, and work is now in progress, removing the shoals which formed during the spring freshets. The appropriation of 1892 has been, and will be, applied wholly to annual maintenance of channels, and will not reduce the estimate for completion of permanent work, which is $130,000. Dredging early in each year to restore the channels filled by spring freshets is imperatively necessary for the commerce of this river, and should be done whenever funds are available, in preference to the projected permanent improvements. Since this part of the project has been definitely adopted and put in practice, the river has been on the average in much better navigable condition than before.

Future appropriations will be applied to the maintenance of the 9-foot channels, necessary for navigation of the river, to raising the Hartford Dike, and completing the Saybrook jetties, and to widening the channel at Saybrook Bar.

Ninety thousand dollars could be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR 1892.

Receipts and shipments by water.

Articles.	Tons.	Estimated value.
Coal	350,000	$1,140,000
Stone (mainly from Portland)	300,000	1,200,000
Miscellaneous	300,000	50,000,000
Total	950,000	52,340,000

Vessels employed in this traffic.

[Draft 7 to 12 feet.]

Vessels.	Number.	Tonnage.	Vessels.	Number.	Tonnage.
Owned in district:			Not owned in district:		
Steamers	14	3,500	Vessels of all kinds	90	15,500
Sail vessels	45	5,600			
Barges	36	8,000	Total	185	32,600

HOUSATONIC RIVER AND BREAKWATER, CONNECTICUT.

The Housatonic is a long, shallow river, running southward through Massachusetts and Connecticut and emptying into Long Island Sound just east of Stratford Point, about 15 miles southwest from New Haven. At Derby, 13 miles above its mouth, it receives the discharge of the Naugatuck, a small, rapid river. This point, which has been regarded as the head of navigation, is nearly the head of tidewater. About a mile above there is a dam across the Housatonic River, furnishing large water power. The original depth on the worst bars in the river (six in number) was from 3.5 to 4.5 deep at mean low water; there was also a bar across the river's mouth, with about 4 feet low water depth.

In 1871 a project was adopted for making and maintaining a channel 100 feet wide and 7 feet deep at mean low water throughout this distance. Besides the necessary dredging, it contemplated building a breakwater east of the channel over the bar at the river's mouth.

A channel of the required depth has been dredged several times through the worst bars.

July 1, 1892, the available depth in the river channel was about 4½ feet at mean low water, and over the bar, at the mouth, about 6 feet; the breakwater had been built to a length of 4,572 feet.

During the past fiscal year dredging has been done to make a depth of 7 feet on the outer bar, where work is now in progress, and the breakwater has been extended to a total length of 4,740 feet.

Under existing contracts, the channel at the mouth will be completed to 7 feet depth, the breakwater will be further extended to a length of about 5,000 feet; and a small dike will be begun near the mouth of the river, intended to straighten the channel and to reduce the dredging at the bend below Stratford. In order to make the channel permanent over the outer bar, it is necessary to further extend the breakwater, as projected.

Appropriations up to date aggregate $166,242. It will require $112,000 to complete the improvement, and $4,000 should be added to this amount annually for maintenance of the dredged channel and for repairs. One hundred thousand dollars can be profitably expended in the next fiscal year.

COMMERCIAL STATISTICS FOR 1892.

At Derby and Shelton, the head of navigation, 520 vessels, with a tonnage of 86,256, arrived and departed. Freights amounting to 109,700 tons, valued at $2,028,038, were received and shipped.

At Stratford, near the mouth of the river, 11,695 vessels (including 10,000 oystermen) arrived and departed, with an aggregate tonnage of 155,500 tons. Ninety-two thousand tons of freight were received and shipped, valued at $1,037,500.

THAMES RIVER, CONNECTICUT.

This river is formed by the confluence of the Yantic and Shetucket rivers at Norwich, Conn., and extends southward as a tidal stream 15 miles to Long Island Sound. For 11 miles above its mouth the channel is from 13 to 80 feet, averaging over 30 feet for the first 4 miles. For 3 miles below Norwich the available depth in 1829 was but 6 feet at mean low water, where now there is 11 feet. In 1836 a project was adopted for making the channel 100 feet wide and 14 feet deep at mean high water (11 feet at low water) by dredging and building piers. In 1878 a channel 14 feet deep at low water was projected, and in 1882 a modification was adopted providing for a channel 200 feet wide and 14 feet

deep at mean low water, to be obtained by dredging and by building five dikes or training walls along the outer sides of the channel curves. The estimated cost was $208,080, and a balance of $20,000 from previous appropriations was then available. In 1888 the project was extended to include making 16 feet depth as far up as Allyn Point and 14 feet from there to Easter Point, at an additional cost of $40,000.

Under the provisions of the river and harbor act of July 13, 1892, $10,000 of the appropriation for Thames River is authorized to be expended in the improvement of Shaws Cove, New London, and the total estimated cost of this additional work, $48,000, has been added to the estimate required for completion of the existing project for the improvement of the river. The original depth in this cove was from 2½ to 8 feet at mean low water, and the channel was narrow and crooked. The project provides for making a channel 100 feet wide and 12 feet deep, with an anchorage basin of the same depth, 800 by 400 feet.

Up to July 1, 1892, three of the proposed dikes had been completed, and the fourth one nearly so; and the channel had an available depth from Norwich to Easter Point (3½ miles) of nearly 12 feet, with width of 75 to 125 feet; from Easter Point to Allyn Point, 14 feet depth with 175 feet width; below Allyn Point 16 feet depth with 200 feet width. At extreme high water the depth was sufficient for the commerce of the river, but the channel was too narrow for convenience and safety.

No work had been done in Shaws Cove.

The total amount expended in improving Thames River, Connecticut, up to July 1, 1892, was $369,759.05.

During the past fiscal year, the widening and deepening of the channels in the upper part of the river was begun, under a contract still in progress; the channel in Shaws Cove was made the full length and depth, with width of 60 feet, and the anchorage basin at the bend was begun.

The addition of the improvement of Shaws Cove, New London Harbor, to this project, increases the present estimate for completion of project from $55,600 to $93,600.

Fifty thousand dollars could be profitably expended in fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS FOR 1890.

Vessels arriving and departing.

[Draft 4 to 16 feet.]

Vessels.	Number.	Number of round trips.
Steamers	404	202
Sailing vessels	36	18
Barges	370	185
Total	810	405

Freight by water:	Tons.	Freight by water—Continued.	Tons.
Coal received	353,319	Miscellaneous shipped	39,780
Iron received	11,358		
Lumber received	11,500	Total	467,144
Miscellaneous received	51,187		

The amount of freight reported for 1890 is greater than that reported for 1889 by 63,144 tons. Its total value can not be closely estimated; it is probably in the neighborhood of $25,000,000.

The statistics for 1892 have not been received as yet.

MYSTIC RIVER, CONNECTICUT.

Mystic River is a narrow tidal stream in the eastern part of the State of Connecticut, about 7 miles west from the boundary of the State of Rhode Island. The navigable part of the river extends in a general north-northeasterly direction for nearly 4 miles from Fisher Island Sound, past the villages of Noank, Mystic River, and Mystic Bridge, above which places it receives the discharge of several small fresh-water streams. The villages of Mystic River and Mystic Bridge lie respectively on the west and east banks of the river, opposite each other and about 3 miles above Fisher Island Sound. At this point the river is crossed by a highway bridge with a draw. Nearly a half mile farther down is the drawbridge of the New York, Providence and Boston Railroad, and about 1½ miles still farther the village of Noank lies upon the west bank. The population of Mystic River and Mystic Bridge together is about 4,000; that of Noank about 2,000.

Directly opposite the mouth of the river lie Mystic or Ram Island and Ram Island Shoal, which cause the channel to divide and branch off sharply to the northeast and southwest. The northeast channel is 18 feet or more in depth and of sufficient width, but crooked. It is the one used by large vessels. The southeast channel opens out into a broad flat with about 12 feet available depth.

The river channel up to within about a half mile below the highway bridge has a low-water depth of 15 feet or more. Its width, from 80 to 300 feet, is sufficient, but there are several bends in its course which make it somewhat difficult of navigation.

Under act of Congress of August 11, 1888, a preliminary examination of Mystic River was made. In the report on this examination a project for improvement was submitted, which consisted in dredging to make the channel 15 feet at mean low water and 100 feet wide and to reduce five bends in the channel. The estimate of cost was $30,000.

Twenty thousand dollars has been appropriated for this work, of which amount $9,774.40 had been expended up to July 1, 1892.

The total amount dredged from this river during the past fiscal year was 38,034 cubic yards. From the railroad bridge downstream to the first bend the channel was widened by 25 feet, making it 100 feet wide, and removing shoal spots in the old channel; at the first bend it was widened 100 feet, rounding off the bend and making the channel from 100 to 160 feet wide; at the second bend, near the Quarry Wharf, it was widened by 50 feet; depth made, 15 feet at mean low water.

The channel is completed as designed from the highway bridge at Mystic down to and including the first bend, being 15 feet deep at mean low water, and 100 feet wide, with greater width at the bends; at the second bend the channel is about 100 feet wide; at the third and fourth bends, opposite Sixpenny Island, no work has yet been done; at and above the fifth or lowest bend it has been widened from 25 to 75 feet; it was contemplated widening about 50 feet more at the point of the bend, but ledge rock was encountered, and further work at this bend will be deferred for the present, the existing width being sufficient, with careful use, to accommodate the present navigation.

Ten thousand dollars will be required to complete the existing project, all of which could be profitably expended during the year ending June 30, 1895.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR 1891, MYSTIC RIVER, CONNECTICUT, INCLUDING VILLAGES OF MYSTIC AND NOANK.

Vessels arriving and departing.

[Draft from 7 to 12 feet.]

Vessels.	Number.	Total round trips.
Steamers	134	386
Sailing vessels	39	39
Barges for coal and other freight	21	505
Total	194	930

Freight by water.

Kind of freight.	Tons.	Estimated value.
Coal	6,508	$26,000
Lumber (350,000 feet)	525	6,500
Stone *	22,722	14,000
Miscellaneous	1,242	27,000
Total	31,998	73,500

* The stone is reported for the fiscal year ending June 30, 1892.

SAUGATUCK RIVER, CONNECTICUT.

This river is a tidal stream, extending inland about 4½ miles by course of channel from Long Island Sound to Westport, Conn. It has a natural depth of 5 feet at mean low water, in a rather narrow, crooked channel, up to the railroad bridge at Saugatuck, about 3 miles from the sound; thence the depth decreases gradually until at Westport it is less than 1 foot. The channel is somewhat obstructed by rocks in its upper part.

In 1838 a breakwater was built on Cedar Point, to secure the beach, and in 1840 a canal was dug in order to shorten the distance from West Port to the city of New York by 5 miles. The breakwater is now in fair condition, the canal has been gradually filled up, and is now of very little use, being bare at both ends at low water.

It is recommended by the engineers in charge that the project of improving the canal be abandoned for the present; the balance of opinion being in favor of the deepening of the channel.

In accordance with the requirement of the river and harbor act of 1890, an examination of this locality was made in January, 1891.

The following estimates for improvement were submitted:

1. For improvement of the natural channel:
   - *a.* To secure a width of 100 feet and depth of 6 feet $40,000
   - Annual cost of maintenance 2,000
   - *b.* To secure a width of 60 feet and depth of 4 feet 10,000
2. For enlarging the canal (or short cut) to make a channel 100 feet wide and 5 feet deep 21,000
   - Annual cost of maintenance 2,500

The project under which the work is now going on is the one marked *a*, under the improvement of the natural channel. Seven thousand dollars was appropriated in 1892. This amount will more than half complete the work. Amount (estimated) required for completion of existing project, $3,000; amount that can be profitably expended in fiscal year ending June 30, 1895, $3,000.

NEWTOWN CREEK AND BAY, NEW YORK.

Newtown Creek is a sluggish tidal stream, about 4 miles long, running through the eastern part of Brooklyn and emptying into the East River opposite Thirty-fourth street, New York. The creek runs through a part of Brooklyn occupied by large industries, notably sugar refineries, oil and chemical works. The commerce of the creek averages from $25,000,000 to $30,000,000 per annum. The foreign tonnage entering the creek each year is over 200,000 tons.

COMMERCIAL STATISTICS FOR 1892.

Vessels arriving and departing.

Class.	Number.	Tonnage.
Steamers	12	15,240
Ships	26	31,200
Barks	125	87,500
Brigs	13	10,400
Schooners	2,226	1,113,000
Lighters	1,022	204,400
Barges	2,782	556,400
Canal boats	3,068	306,800
	9,274	2,324,940

There were built on Newtown Creek during 1890, 23 new vessels, 7,200 tons capacity and valued at $265,000.

In 1880, before improvement was undertaken, the creek had 12½ feet of water at the mouth, shoaling to about 4 feet at the head, but at present, as a result of improvements projected in 1880 and modified in 1884, has a wide channel from the mouth to Vernon avenue bridge averaging 21 feet in depth. The present project contemplates providing for carrying the improvement from Vernon avenue bridge, where the creek divides into two branches, up to the head of navigation in both branches. This project was adopted in 1884 and its estimated cost was $255,569. Of this sum $177,500 had been expended or contracted for to July 1, 1893, and at that time the condition of the improved channels was described as follows by the Chief of Engineers:

The channel from the entrance to Vernon avenue bridge was 175 feet wide and 18 feet deep, mean low water; from Vernon avenue bridge to Central Oil Works, 80 feet wide and 16 feet deep; from Central Oil Works to Queens County Oil Works, 100 feet wide and 14 feet deep; from Queens County Oil Works to Nichols Chemical Works, 75 feet wide and 10 feet deep; from Nichols Chemical Works to Maspeth avenue, 50 feet wide and 10 feet deep; from Maspeth avenue to Metropolitan avenue, east branch, 100 feet wide and 9 feet deep, and on west branch, 50 feet wide and 10 feet deep. In the English Kills Branch the channel is 100 feet wide and 8 feet deep, mean low water, from Nichols Chemical Works to a point 700 feet to the eastward.

The cause of the habitual shoalings immediately following dredging is the absence of bulkheads to confine the banks.

The existing channel is not adequate in width or depth to the demands of commerce, and the adopted project for improvement should be completed as early as practicable by methods which will carry the improvement progressively from the mouth to the head of navigation.

Amount (estimated) required for completion of existing project..... $78,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1895 78,000.00

HARLEM RIVER, NEW YORK.

The streams embraced in the improvement contemplated in the Harlem River are the Harlem River and the Spuyten Duyvil Creek, the former emptying into the East River near Hell Gate, and the latter into the Hudson River about 13 miles north of the Battery, and together separating Manhattan Island from the mainland. There has always been an exchange of waters between these two streams at Kingsbridge, though a long ledge of rocks awash at mean low water and an extremely narrow channel at that point have heretofore prevented the exchange being a free one. The object of the improvement is to form a navigable channel between the East and Hudson rivers.

The project as originally adopted in 1875 was for a channel 350 feet wide and 15 feet deep at mean low water. In 1879 the project was so far modified as to increase the width of the channel in the Harlem River and Spuyten Duyvil Creek to 400 feet, and retaining the original width of 350 feet through Dyckman Meadow, but increasing the depth to 18 feet, mean low water. This project was revised in 1886 by narrowing the channel immediately north of High Bridge, where it skirts the Ogden estate on the east bank, to a least width of 375 feet. The estimated cost of the work was $2,700,000.

The amount expended upon the improvement up to the close of the fiscal year ending June 30, 1893, inclusive of outstanding liabilities, was $748,274.10.

At that date the excavation of the section of canal prism lying between the two dams had been completed, with the exception of a ledge of rock, covering an area of about 8,000 square feet, in the northeast corner of the cut, which was in process of removal when the dams were breached during the severe storm of April 21, 1893, and which will be removed by drilling and blasting without restoring the dams. A total of 730 linear feet of stone retaining wall and 190 linear feet of timber revetment had been built to protect the side slopes of the canal chamber where necessary, to prevent the loose rock and earth arising from degradation of the slopes from falling into the cut after the canal had been opened to navigation.

In the Harlem River a channel 9 feet deep, mean low water, and about 160 feet wide, had been dredged from a point 600 yards north of Morris Dock, where it connects with the natural channel, to within 200 feet of the east dam. A number of large bowlders had also been removed from the channel at High Bridge and from the cross-over directly south of Morris Dock, increasing the navigable depth from 7½ feet to 10 feet at the former point, and from 6½ feet to 8 feet at the latter.

In Spuyten Duyvil Creek a channel 9 feet deep, mean low water, and 140 feet to 150 feet wide, had been dredged from the Hudson River Railroad drawbridge at the mouth of the creek, through the point of meadow known as Bell Pumpkin, and also through the point of meadow lying directly north of the Government dock, to within 140 feet of the west dam.

The amount required for the completion of the work is $1,805,000, of which $500,000 can be expended to advantage in year ending June 30, 1895.

COMMERCIAL STATISTICS.

As there is no navigable communication between the Harlem River and Spuyten Duyvil Creek, the present navigation of the Harlem River is practically confined to that part of the stream between its junction with the East River and Satterlee's Dock at the foot of Two hundred and twentieth street, a distance of about 8 miles

Spuyten Duyvil Creek is navigable from its junction with the Hudson River to Kingsbridge, a distance of $1\frac{3}{4}$ miles.

The actual commerce of the Harlem River and Spuyten Duyvil Creek for the fiscal year ending June 30, 1890, and June 30, 1893, was as follows:

Items.	1890.	1893.	
	Tons.	*Tons.*	*Value.*
General merchandise	1,379,334	3,232,052	$159,635,435
Grain, flour, feed, etc	400,987	596,306	15,147,478
Lumber and timber	346,858	451,702	7,462,403
Building material	643,922	602,217	2,791,100
Fuel	508,365	878,234	4,573,836
Ice	111,000	149,865	539,460
Total	3,390,466	5,910,376	190,149,712

The total tonnage for the year 1893 shows an increase over that of 1890 of 2,519,910 tons, or about 75 per cent, during the three years. This increase is largely due to the increase in the amount of freight handled at the docks of the New York, New Haven, and Hartford Railroad Company, directly below Second Avenue Bridge, where alone 3,243,850 tons were received and shipped as compared to 1,407,882 tons received and shipped in 1890. At the docks of the New York and Northern Railway Company, near High Bridge, 166,066 tons were received and shipped. Of the balance of the tonnage, 2,475,275 tons were distributed among the various docks on the Harlem River between its junction with the East River and Satterlee's Dock at Two hundred and twentieth street, and 25,185 tons at various points on Spuyten Duyvil Creek.

As near as can be determined the traffic on the river was carried by the following vessels:

Canal boats, barges, and railroad-car floats	20,361
Sailing vessels, schooners, lighters, etc	4,476
Steamers and tugs, exclusive of naphtha launches	15,241
Total	40,078

A large proportion of the freight handled at the railroad docks is carried in and out of the Harlem on railroad-car floats and transfer boats connecting the railroads of New Jersey and Pennsylvania, terminating at Weehawken, Hoboken, and Jersey City, with those of New England, while the general commerce of the river is carried on mainly in barges and canal boats in tow of steam tugs, and in schooners and the smaller class of sailing vessels.

EAST RIVER AND HELL GATE, NEW YORK.

The East River is the name given to the narrow tidal strait which connects New York Harbor with Long Island Sound. It forms an entrance to the harbor of New York secondary in importance only to the main entrance by way of Sandy Hook and the Narrows, since the heavy coasting trade carried on by New York with the New England States and the British American provinces passes almost exclusively through it. New York City can grow only in one direction, into Westchester County, on the north, since on all other sides it is surrounded by water, and the development of the water fronts along the Hudson and the East Rivers must, therefore, be certain and rapid. With this development the importance of the East River entrance to New York Harbor will increase enormously; and within the next fifty years every foot of shore line on both sides of the East River, within 15 miles of Harlem River and Hell Gate, will be occupied with wharves filled with shipping engaged not only in the coasting and transatlantic trade, but in the commerce of the world.

The East River is crooked and narrow in places, and much obstructed by rocks, and affected by violent currents. The worst of these obstruc-

tions is that known as Hell Gate, lying at the mouth of the Harlem River, between Blackwells and Wards Islands, about opposite Ninety-sixth street, New York. Here the rives turns at right angles, divides into several channels, and runs with a fearful velocity over and around the many obstructing rocks and reefs. Besides this most dangerous point there are many other rocks and reefs in the East River, especially those off Thirty-fourth street and Ninth street, which are dangerous to its crowded navigation.

Originally the depth over these many and dangerous obstructions varied from total exposure at low tide to 12 and 14 feet of water. Hallets Point projected from the shore at Astoria under water 325 feet to the contour of 26 feet at mean low water and embraced an area of about 3 acres. The Middle Reef, with an area of about 9 acres, lay in the middle of the channels at Hell Gate. It had a small backbone projecting above high water, called Flood Rock, upon which vessels were stranded when driven there by the ebb currents which swept directly over the rock.

To the northward, near the mouth of the Harlem River, lay the two Mill Rocks, both of which were usually visible at high water. To the eastward, Frying Pan had only 11 feet, mean low water; Heel Tap, 12 feet; Pot Rock, 20 feet, and North Brother Island Reef, 16 feet.

The project of improvement adopted in 1867 provided for the removal to the depth of 26 feet, mean low water, of the rocks and reefs that lay directly in the channel at Hell Gate, and for the construction of sea walls and dikes upon others that lay near the edge of the channel. The estimated cost of the project, revised in 1870, was $4,689,820.

Besides the obstructions before enumerated submerged rocks were known to exist at other points in the channel, such as Diamond Reef, 16½ feet, mean low water, off the Battery; Coenties Reef, 14.3 feet, mean low water, off Coenties Slip; Shell Reef, 9 feet, mean low water, between Eighth and Tenth streets; Ferry Reef, 7 feet mean low water, and Charlotte Rock, 14½ feet, mean low water, opposite Thirty-fourth street; the Middle Ground, 11½ feet, mean low water, off Sunken Meadow, at the entrance to Little Hell Gate, and Mid-Channel Reef, 16½ feet, mean low water, at Baretto Point, opposite Rikers Island.

The project was enlarged in 1874, and the total cost estimated at $5,139,120 (Annual Report, Chief of Engineers, 1874, Part II, page 164). Besides the improvements already projected at Hell Gate, the new project provided for the construction of a riprap dike to connect the Mill Rocks, sea walls upon Hog Back and Holmes Rock, and the removal to a depth of 26 feet, mean low water, of Diamond Reef, Coenties Reef, and the small rocks known as Scaly Rock, Blackwells Rock, and the rock off Woolsey's bath house.

The project was enlarged in 1884 to provide for the removal of Pilgrim Rock, opposite Nineteenth street, to 24 feet, mean low water; in 1889 for the removal of reef off Diamond Reef to 26 feet, mean low water, and Ferry Reef and Charlotte Rock, opposite Thirty-fourth street, to 26 feet, mean low water; in 1890 for the removal of Shell Reef and reef off Sunken Meadows to 18 feet, mean low water; and in 1892 for the removal of Baretto Reef to 24 feet, mean low water.

The amount expended up to the close of the fiscal year ending June 30, 1892, inclusive of outstanding liabilities, was $4,057,329.98. At that date Hallets Point, covering 3 acres, Way Reef, Shell Drake, Diamond Reef, North Brother Island Reef, Coenties Reef, reef off Diamond Reef, and Scaly Rock had been removed to the depth contemplated in

the project. Pilgrim Rock had been reduced to a least depth of 24 feet; Heel Tap had been broken to 26 feet and dredged to 20.5 feet, and the least depths on Frying Pan and Pot Rock were 18 feet, and 22.8 feet at mean low water, respectively; Ferry Reef, off Thirty-fourth street, had been lowered from a least depth of 7.1 feet to a least depth of 22 feet; Flood Rock and connecting reefs, covering 9 acres, had been broken to 30 feet, and 177,376 tons of débris had been removed; the Negro Heads and Hen and Chickens had been reduced to 18 feet, mean low water, and a new 18-foot channel, 500 feet wide, had been opened across the reef. A sea wall had been built by the Government to connect Great and Little Mill rocks, and another by the city authorities on Bread and Cheese. Under contract 56,239 cubic yards of material and 3,468 tons of bowlders had been removed from Shell Reef off Ninth street. These results have been of the greatest value to navigation.

The amount expended in fiscal year ending June 30, 1893, inclusive of outstanding liabilities, was $157,708.20.

Amount (estimated) for completion of existing project, $888,840.67; amount that can be profitably expended in fiscal year ending June 30, 1895, $200,000.

BROWNS CREEK, SAYVILLE, LONG ISLAND, N. Y.

Browns Creek is a small stream flowing midway between the villages of Sayville and Bayport, near the south shore of Long Island, and emptying into Great South Bay, about 11 miles northeast of Fire Island Inlet. From Fire Island Inlet to the vicinity of Browns Creek there is a rather crooked channel of about 8 feet available depth. The entrance to the creek is crooked, narrow, and shifting. Its depth at mean low water is about 0.4 foot. In the stream itself the low water level is from 0.3 to 1.3 feet higher than low water in Great South Bay, and the channel depths are from 0 to 3 feet below low water in the bay. The width of the stream from the bay to the highway bridge, about 5,000 feet, averages 77 feet. Its course lies through a sandy marsh from one-quarter to one-half mile in width, separated from the bay by a low and narrow beach.

Sayville is said to have a permanent population of 3,500 and a summer population of 4,500, and Bayport a permanent population of 1,500 with an increase of 300 in summer, and both towns are growing quite rapidly. The permanent population of these towns depends almost entirely, either directly or indirectly, upon the oystering and fishing industry, there being no manufactures and almost no farms in or near either place. About 325 oyster and fishing boats belonging to Sayville and Bayport are registered at the custom-house in Patchogue, with a total tonnage of 2,950 tons. This is exclusive of all boats under 5 tons, of which there are said to be about 150. The boats draw from 20 inches to 3 feet, and are principally sloops. The oyster and fishing fleet during the summer have to lie at anchor in the open bay. In storms they are frequently washed ashore, as many as ten having been washed ashore in a single night. In the winter they are mostly laid up at Patchogue, 4 miles east, and in the Connequot River, 3½ miles west, as they can enter and leave Browns Creek only on extraordinary high tides.

The object of the improvement is to secure an anchorage ground or place where the fishing boats can lie in safety during rough weather. This can be accomplished by widening and deepening the creek and improving its mouth. To prevent the entrance from filling up by drift

and wave action jetties will be needed on both sides. The jetties are to be of riprap, the top and slopes to be of stone, the top to be 3 feet wide and 1 foot above high water, with slopes of 1 on 1. The creek is to be made 100 feet wide and 4 feet deep at mean low water; the entire project to cost $46,000.

The total amount appropriated for this work is $17,000.

July 1, 1892, the west jetty had been built to a length of 492 feet, and the east jetty partly completed to a length of 450 feet. A channel 100 feet wide and 4 feet deep at mean low water had been dredged 1,450 feet long, extending into the marsh along the stream, which was freely used by small vessels for anchorage during night or storms.

During the past fiscal year the east jetty was completed to a length of 438 feet, removing part of the stone at the outer end to finish the rest of the work; shoals were removed from the dredged channel, which was also extended 443 feet farther up.

Prior to 1891 this creek was of no value for purposes of navigation. It isnow quite extensively used by boats engaged in oystering, etc.

Future appropriations will be applied to maintaining and extending the dredged channel, and to such repairs and extension of the jetties as become necessary. Amount (estimated) required for completion of existing project, $29,000; amount that can be profitably expended in fiscal year ending June 30, 1895, $20,000.

EAST CHESTER CREEK, NEW YORK.

East Chester Creek, called also Hutchinson River, is a small stream which, as a tidal inlet for the last 4 miles of its course, traverses marshes of one-quarter to 1 mile in width and empties into East Chester or Pelham Bay, a large bay on the northwest shore of Long Island Sound, just east of Throgs Neck, and 20 miles by water from the Battery, New York City. The width of the creek varies from 25 feet to a half mile at high water, but the channel is narrow everywhere. It was navigable at high tide only, for vessels drawing 7 feet, up to Lockwood, a distance of 2¼ miles. The rise of tide is 7.1 feet.

The project for improvement adopted in 1872, and subsequently modified, provided for a channel 9 feet deep at mean high water, extending to a point 3,000 feet above Lockwood, and terminating at the upper end in a tidal basin. Part of the lower course of the channel was to be protected by dikes, and the whole work was estimated to cost $221,000.

In 1891 this estimate was revised and reduced by omitting the dikes, which seemed unnecessary for maintenance of channels, making the total estimate of cost from beginning $124,000.

Up to July 1, 1892, $69,000 had been appropriated for this improvement, of which $61,858.97 had been expended in dredging and rock removal to make a channel 9 feet deep at high water (2 feet at low water), with width of 125 feet to the head of Goose Island, one-half mile from the mouth of the creek; thence to Town Dock, with width of 100 feet; thence to Lockwood with nearly the same width. Above Town Dock 1,235 linear feet of diking was built to sustain the sides of the channel. The increased depth and straighter courses resulting have been of benefit to the commerce at Town Dock and Lockwood.

During the past fiscal year the channel was extended 1,300 feet above Lockwood by a cut, mainly through Salt Marsh; the depth made was 9 feet at high water and width at bottom 60 feet.

On the west side of this cut the owners of adjacent land have built a dock front, intending to use it for receiving and discharging freights.

With future appropriations it is proposed to widen the channel below Lockwood and to widen and deepen it above Lockwood, as provided in the modified project. The estimated cost of this work, as submitted in the Annual Report for 1891, is $55,000.

The dikes below Town Dock, at one time proposed, do not seem to be necessary at present as a means of improving or maintaining the channel.

The amount (estimated) required to complete the existing project, $55,000. This entire amount can be profitably expended in fiscal year ending June 30, 1895.

COMMERCE.

Arrivals and departures of vessels.

Schooners	22
Sloops	9
Barges	193
Total	224

Freight received and shipped.

	Tons.
Lumber	7,240
Building material	900
Stone	16,310
Water pipe (iron)	900
Coal	13,285
Ice	9,000
Total	47,115

GREAT CHAZY RIVER, NEW YORK.

The Great Chazy River is the outlet of Chazy Lake; it flows northerly and easterly 40 miles into Lake Champlain, 4 miles south of Rouses Point, New York, draining about 375 square miles of territory.

Champlain village is the head of navigation, and is 5 miles up from the mouth of the river. At this village are located a sawmill, flouring mill, paper mills, 2 foundries, and a shipyard, all depending considerably upon the navigation of this river.

The project of improvement provides for a channel with a least depth of 5 feet and a least width of 40 feet from the mouth of the river to the village of Champlain. It was adopted in 1889, after a survey of the locality, and was estimated to cost $18,000.

Fifteen thousand dollars has been appropriated for this improvement.

The work of widening and deepening the channel has gone on as far as the funds will permit, and it is thought that the balance of the estimate, $3,000, will complete the improvement, and can bev ery profitably expended during fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

Vessels arrived and departed, 1892.

Character of craft.	Arrived.		Departed.	
	Number.	Tonnage.	Number.	Tonnage.
Steam vessels	30	180	30	180
Canal boats	19	1,900	19	1,900

Cargoes:

Value of arrivals	$10,950
Value of departures	16,500

Number of tons shipped and arrived in 1892, 6,000.

PATCHOGUE RIVER, NEW YORK.

Patchogue River is a small stream on the south side of Long Island, emptying into Great South Bay near its eastern end and about 55 miles in a direct line east from New York City. The village of Patchogue, which lies about a mile north of the mouth of the river, has a resident population of about 5,000, which is considerably increased during the summer months. The approach to Patchogue River by water is through Fire Island Inlet, and thence by a rather crooked course for some 14 miles through Great South Bay; the depth through the bay and up to within half a mile of the river's mouth is about 8 feet; at the mouth of the river the depth shoals up to about 2 feet, which depth could be carried up to the village landings.

In 1880, and again in 1886, examinations were made by order of Congress, and subsequently a project was adopted for making a channel 6 feet deep at mean low water and 60 feet wide up to the village wharves, to be protected at the mouth by a jetty on the west side, at an estimated cost of $40,000.

Twenty-three thousand dollars has been appropriated for this work up to date, most of which has been expended.

The channel from Great South Bay to the mouth of the river, dredged 50 feet wide and 6 feet deep in 1891, has shoaled so that the available depth is now scant 5 feet at mean low water; above the entrance to Gilberts Point the depth is fully 6 feet, and width from 60 to 150 feet, partly dredged at private expense. Above Gilberts Point the available depth to the head of the stream is 3½ feet, though it is considerably deeper in places, the result of private dredging.

Twelve hundred vessels, with draft from 4 to 9 feet, tonnage 10 to 50 tons, arrived and departed in 1892, with a total of 120,000 tons of freight, valued at $1,600,000 (this being an increase of 15,000 tons over that of 1890). There were also 150 vessels built and 30 repaired during 1892. Amount required to complete this work, $17,000, all of which can be expended to advantage during the ensuing fiscal year.

SHOAL BETWEEN SISTER ISLANDS AND CROSS-OVER LIGHT, ST. LAWRENCE RIVER, NEW YORK.

This shoal is situated in the St. Lawrence River at a point where nearly the entire commerce of the river is exposed to inconvenience and danger from the necessity of its passage.

COMMERCIAL STATISTICS.

Amount of commerce which passed over the shoals of the St. Lawrence River between Sister Islands and Cross-over Light during the calendar year 1892.

	Tons.
Entered and cleared at Ogdensburg from and to points west (see reports for Ogdensburg Harbor)	698,699
Passed through Canadian canals and down Galops Rapids (from data courteously furnished by John W. Baldwin, secretary Department Railways and Canals, Ottawa)	530,219
Total tonnage passing the section of river under improvement in 1892	1,228,918

An increase of about 630,000 tons over that of 1890.

The river and harbor act of 1888 provided for a survey of these shoals, with a view to their removal to a depth of 18 feet, and upon examina-

tion the engineers submitted a project of improvement calling for the expenditure of $43,305.

Fifteen thousand dollars has been appropriated for this work. A contract already completed and another now going on will consume this amount and will accomplish the removal of the two smaller of the three shoals included in the project. Two outlying spurs of one of these shoals, not detected by the first survey, have been included in the project, increasing it to 2,627 cubic yards, and a pro rata revised estimate of $54,772. The amount required to complete the improvement is $39,772, all of which can be very profitably expended during fiscal year ending June 30, 1895.

PASSAIC RIVER, ABOVE NEWARK, N. J.

The Passaic is one of the most important rivers of New Jersey, passing through the large manufacturing towns of Paterson, Dundee, Passaic, Belleville, and Newark. Its course is very crooked down to Passaic, whence its direction is generally southeast to the mouth below Newark, where its junction with the Hackensack, coming from the north, forms what is known as Newark Bay. The lower end of Newark Bay has two outlets, one the Kill von Kull, toward the east, connecting it with New York Harbor, and the other, the Arthur Kill, or Staten Island Sound, toward the south, connecting it with Raritan Bay.

Up to the passage of the last river and harbor act the river was being improved under two projects, but the appropriation carried in that act was for the entire river; so that now the funds will be expended where navigation most demands it.

In its original condition the river above Newark for a distance of about 8 miles had a navigable 6-foot channel except at Middle, Belleville, Rutherford Park, and Holzman bars, where the depths were 4.5 feet, 3.9 feet, 3 feet, and 3.5 feet, respectively. Project of improvement was adopted in 1872 and provided for a channel across and above the shoals from 7½ to 6 feet deep mean low water, and from 200 to 50 feet wide, to be obtained by dredging and diking, at a cost of $123,924. It was modified in 1885 by extending the channel below Middle Bar 1,500 feet to the Erie Railroad bridge, increasing the estimate to $129,000, which was further increased in 1886 to $133,762. The deposit of material from freshets, together with the difficult and costly nature of the dredging, prompted a recommendation to increase this last estimate to $193,822, which was approved October 6, 1890.

The amount expended to June 30, 1892, was $135,677.06, with which channels had been dredged to the requisite depth, with widths of from 60 to 75 feet, a channel through Third River Bar dredged to the required depth, with width of 100 feet for a distance of 800 feet, and below this bar the channel was increased in width by 40 feet, with the same depth for a distance of 700 feet, and by 20 feet for a further distance of 245 feet, giving a continuous channel through this reach having a width of 100 feet and depth of 6 feet, mean low water.

During the year ending June 30, 1893, the channel through Belleville Bar was completed to required width of 100 feet and from 6 to 7 feet depth, mean low water. Work is now and has been going on during the last year.

PASSAIC RIVER, BELOW NEWARK, N. J.

This is the lower reach of the river extending from Newark to its confluence with the Hackensack, forming Newark Bay, a distance of about 8 miles. The commerce passing through this portion of the Passaic River is of great importance and during the past few years has developed materially.

A survey of this portion of the river, made in 1879, showed depths ranging from 2 or 3 feet to 7½ feet, and the project adopted, based on this survey, provided for the formation of a channel 200 feet wide and 10 feet deep from the bay to the city of Newark. Subsequently this project was extended so as to provide for extending the dike at the mouth of the river into the bay, a distance of 12,000 feet, and for dredging a channel across the shoal in Newark Bay 200 feet wide and 10 feet deep at mean low water, increasing the original estimate to $353,875.

The amount expended to June 30, 1892, was $233,692.18.

With this amount 6,205 feet of dike had been built and maintained, the channel through the shoal in the bay and the channel up the river as far as Lister Dock dredged to the required dimensions, and a bar above the Zinc Works Dock removed to the required depth, with a width of 120 feet for a distance of 1,600 feet up stream. A survey made in December, 1892, shows that the above conditions have been fairly well maintained.

The amount required to complete the entire improvement of the river is $124,347, of which amount $60,000 can be expended to advantage during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The following statistics relative to the commerce of Passaic River, New Jersey, during the year ending December 31, 1892, were furnished by Mr. P. T. Quinn, secretary of the board of trade, Newark, N. J.:

Articles.	Amount.	Value.	Vessels.	Number.	Average draft.	Average tonnage.
	Tons.				*Feet.*	
Building material	332,325	$4,106,581	Steam	10,269	9	475
Iron and ores	221,841	11,092,070	Sail	6,949	8	200
Fertilizers	342,732	3,473,000	Barges	5,852	6	200
Coal	75,000	300,000	Rafts	1,290	.....	.....
Miscellaneous	390,749	23,081,657	.....	.....	.....	.....
Total	1,362,647	42,053,308	.....	24,360	.....	.....

The commercial statistics have heretofore been given separately, but owing to the wording of the last river and harbor act, it is deemed best to give them for the entire river.

RARITAN RIVER, NEW JERSEY.

The Raritan is one of the largest rivers in New Jersey, running through the center of the State in a very tortuous course toward the east, and emptying into Raritan Bay at its head, near the outlet of the Arthur Kill, or Staten Island Sound. Perth Amboy is situated on the north bank, at the mouth, and South Amboy on the southern bank.

The head of navigation on the Raritan River is New Brunswick, situated 12½ miles above the mouth, although small boats can get up 5

miles further, to where the river is crossed by a dam which feeds the Delaware and Raritan Canal. The Delaware and Raritan Canal, the eastern end of which is at New Brunswick and the western end at Bordentown, form with the Raritan River a connecting link of water navigation between the cities of New York and Philadelphia.

COMMERCIAL STATISTICS FOR 1892.

Articles.	Amount.	Value.	Vessels.	Number.	Average draft.	Average tonnage.
	Tons.				*Feet.*	
Building material	423,111	$2,178,890	Steam	1,617	7	166
Coal	267,490	1,122,140	Sail	2,131	9	206
Sand and clay	135,845	170,067	Barges	4,560	6	178
Iron and ores	33,344	1,000,320	Rafts	164	.....	.....
Miscellaneous	260,512	23,222,600	.....	.....	.....	.....
Total	1,120,302	27,694,017	.....	8,472	.....	.....

The project originally adopted in 1874 had for its object to dike and dredge at the Stakes and Middle Ground, and to remove other shoals up to New Brunswick, so as to make a channel 200 feet wide, affording 10 feet depth at mean low water from the mouth to New Brunswick, a distance of 12 miles.

It was modified in 1881 so as to provide, in addition, the opening of South Channel, 13,000 feet long, 100 feet wide, and 5½ feet deep, mean low water, starting near Kearney's lower dock, south of "The Stakes," following the right bank closely to Whiteheads lower dock, and thence passing to the main channel through an opening in the dike at the lower end of Crab Island.

The amount expended to June 30, 1892, under this project was $555,489.18.

The above amount was expended in the construction and maintenance of certain dikes required by the project at "The Stakes" and "Middle Ground," in dredging channels 200 feet wide and 12 feet deep at mean low water at these points, and in blasting and dredging a channel of the same dimensions across the rocky shoal at Whitehead sand dock, and thence up the river with a depth of 100 feet and depth of 10 feet to within 2,280 feet of the canal lock at New Brunswick. Under two special allotments made for it in the acts of March 3, 1881, and August 2, 1882, the south channel was dredged to the required depth for a distance of 4,000 feet. These improvements have been af great benefit to navigation, permitting the large tows in use on the river to reach a point 2,280 feet below New Brunswick at all stages of the tide.

The expenditures during the fiscal year amounted to $21,877.09. With this amount the channel has been given a width of 100 feet and depth of about 10 feet at mean low water for a distance of 400 feet, through a river bed of extremely hard shale rock, bringing the 100-foot channel to within 1,880 feet of the canal lock at New Brunswick; the channel to Acken dock redreged to a width of 50 feet and depth of 6 feet at mean low water for a distance of about 600 feet, and repairs to the dikes at the "Middle Grounds" completed.

Amount required for completion of the present improvement, $1,482,412; $100,000 of which can be profitably expended in ensuing fiscal year.

SHREWSBURY RIVER, NEW JERSEY.

The Shrewsbury River is a large shallow estuary in northeastern New Jersey, entering the lower bay of New York at the junction of the peninsula of Sandy Hook with the mainland, about 1 mile due north from the lights on Navesink Highlands.

The Shrewsbury River is susceptible of being made a very valuable navigable river at moderate expense. Its commerce is considerable, its shores are thickly settled throughout its length, the country is very rich, and during the season of navigation the population served is very large. Six steamboats make regular daily trips to and from New York, carrying large quantities of freight of all descriptions and doing a large passenger traffic, and every improvement made by the Government has been promptly put to use.

COMMERCIAL STATISTICS, 1892,

Articles.	Amount.	Value.	Vessels.	Number.	Average draft.	Average tonnage.
	Tons.				*Feet.*	
Produce	220,000	$2,010,000	Steam	52	4½	350
Oysters and fish	8,000	800,000	Sail	88	3	25
Fertilizers	63,000	441,000	Barges	34	3	25
Coal	80,000	320,000	Rafts	32		
Lumber	1,000	20,000				
Miscellaneous	300,000	3,000,000				
Total	672,000	6,591,000		206		

The above table shows an increase of 49,000 tons over amount reported for year ending December 31, 1891.

When the project for its improvement was adopted, in 1879, the river was obstructed by a number of shifting sand bars which had caused the complete suspension of navigation in the South Branch, and only permitted the passage of vessels engaged in commerce up the North Branch at or near high water. A considerable trade was carried on, however, even under these difficult conditions.

The original project for the improvement was to dredge a channel 6 feet deep at mean low water, and from 300 to 150 feet in width, across the shoal from the mouth to Red Bank, on the North Branch, 8 miles, and Branchport, on the South Branch, 9 miles, maintaining these channels by longitudinal dikes. This project has not been modified as to the end sought, but estimates of the diking, dredging, and cost have been increased from time to time.

The amount expended on this project to June 30, 1892, was $224,459.68.

With this amount numerous dikes have been built and maintained and channels dredged and redredged in various parts of both branches and main stem 6 feet deep and from 25 to 100 feet wide.

The expenditures during the fiscal year amount to $3,186.87, which was used in repairing dikes at the mouth and in the North Branch and in redredging channels at various points in the river.

The amount required to complete the existing project is $20,062, all of which can be profitably expended in ensuing fiscal year.

SOUTH RIVER, NEW JERSEY.

South River, New Jersey, draining a land basin 30 miles long and 10 miles wide, is a small tidal stream entering the Raritan River from the south, about 8½ miles above South Amboy and 4 miles below New

Brunswick. Its width varies from 100 to 500 feet for the first 10 miles up. The bottom is sand and clay, and the river is obstructed by frequent bars with from 2 to 5 feet of water upon them, separating short stretches of water from 6 to 12 feet deep.

Commercial statistics, 1892.

Articles.	Amount.	Value.	Vessels.	Number.	Average draft.	Average tonnage.
	Tons.				*Feet.*	
Building material	135,262	$302,000	Steam			
Sand, clay, etc	6,000	12,500	Sail	1,258	6	67
Coal and wood	9,200	36,800	Barges	415	6	115
Fertilizers	11,000	16,500				
Miscellaneous	1,000	2,506				
Total	162,462	370,300		1,673		

The above table shows a decrease of 207,873 tons when compared with amount reported for calendar year 1891.

The present project, adopted in 1880, provides for closing the river below the head of the canal, correcting the direction of the mouth of the latter and obtaining by diking and dredging a depth of 8 feet, mean low water, to Washington, 6 feet to Bissetts, and 4 feet to old bridge, straightening the channel at two points by cutting across the meadow; estimated to cost $194,695. This was modified July 30, 1892, by omitting the proposed cut-off and dikes and substituting therefor the dredging of the river between Washington and the Raritan River railroad bridge, removing 39,000 cubic yards of material, reducing the original estimate to $176,975.

The amount expended under this project to June 30, 1892, was $69,552.87.

With this amount the direction of the mouth of the canal had been changed, the dikes below Washington completed and maintained, a small amount of dredging done on a shoal above Washington, a shoal at the mouth of Washington Canal removed, and a channel dredged 60 feet wide through the canal and 50 feet wide across the shoal in the river below Washington. The channel below the draw of the Raritan River Railroad bridge was given a depth of 4 feet at mean low water, with additional width of 25 feet for a distance of 350 feet, and for a like distance above the bridge the width was increased to 70 feet. At Rourke Reach the channel was given a depth of 6 feet at mean low water, and width of 60 feet for a distance of 860 feet; in addition a bar opposite Whitehead's brickyard was removed to a depth of 8 feet at mean low water, and width of 60 feet for a distance of 450 feet, and at the junction of the canal and South River a channel was excavated 350 feet long, 60 feet wide, and 6 feet deep at mean low water.

About $6,500 has been expended in the last fiscal year. With this amount the channel was given a depth of 6 feet mean low water, widths of from 50 to 100 feet for a distance of 1,850 feet, extending from the Turnpike bridge and connecting with a channel similar in depth existing as far as the Raritan River Railroad bridge; a width of 100 feet being maintained for the first 200 feet of its length, then 75 feet for a distance of 585 feet and 50 feet for the remainder.

The present condition of the river is such that it may be navigated at any stage of the tide by vessels of 6 feet draft for a distance of about 3 miles above its mouth.

Amount required for completion of existing project, $98,975; $30,000 of which can be spent to advantage in ensuing fiscal year.

ALLOWAY CREEK, NEW JERSEY.

Alloway Creek discharges into the Delaware River at a point about 7 miles below Fort Delaware. The project for its improvement was based upon a survey made in 1889, and proposed the improvement of the stream between Quinton, N. J., and its mouth, a distance of 10½ miles, by the formation, by dredging, of a channel 6 feet deep at mean low water and 60 feet wide from Quinton to a point about 1,000 feet above the Upper Hancock bridge; from thence a channel of the same depth and 75 feet wide to the lower side of the bar at the Square. At a locality in the creek known as the Canal, in addition to obtaining a channel of the dimensions above named, the width of the stream is to be increased to about 150 feet between its low-water lines. At the Square the dredged channel is to be supplemented by a deflecting dike about 500 feet in length, formed of the material dredged from the adjacent bar, with its channel face protected by a riprap of stone. The estimated cost of the work was $25,000.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for years ending December 31, 1891 and 1892.

Kind of vessels.	Arrivals.				Departures.			
	1891.		1892.		1891.		1892.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
Steamers	100	10,500	70	7,350	100	10,500	70	7,350
Sailing vessels	45	4,500	40	4,000	45	4,500	40	4,000
Canal boats	15	2,250	70	10,500	15	2,250	70	10,500
Total	160	17,250	180	21,850	160	17,250	180	21,850

Freight statement.

Articles.	1891.		1892.	
	Gross tons.	Value.	Gross tons.	Value.
ARRIVING.				
Coal	8,000	$27,000	12,000	$40,000
Glass sand	1,500	2,250	2,500	3,700
Tin plate	800	80,000	1,564	110,000
Lumber	1,400	16,000	4,800	50,500
Soda ash	400	12,000	525	15,000
Oyster shells	.....	.....	2,146	5,000
Merchandise	.....	.....	7,500	225,000
Miscellaneous	3,000	6,000	2,109	47,400
Total	15,100	143,250	33,141	496,600
DEPARTING.				
Manufactured products	7,000	350,000	.....	.....
Glass	.....	.....	2,480	150,000
Canned goods	.....	.....	1,488	400,000
Ship timber	.....	.....	250	5,000
Grain and farm products	.....	.....	3,348	75,000
Miscellaneous	2,000	10,000	.....	.....
Total	9,000	360,000	7,566	630,000

Nine thousand dollars has been appropriated for this work up to now.

The channel now has a depth of 6 feet and width of from 40 to 75 feet wide through the worst bars at localities known as the Square, Canal, and Upper Hancock bridge. This is about one-third of the work.

Sixteen thousand dollars will complete the improvement, and this amount can be expended in ensuing fiscal year.

ELIZABETH RIVER, NEW JERSEY.

This stream, which is $2\frac{5}{8}$ miles in length from its mouth to the head of navigation, at Broad street, Elizabeth, has a width of from 50 to 90 feet, and before its improvement the wharves in the city could only be reached at high water by vessels drawing less than 4 feet. The city of Elizabeth has a population of about 38,000.

COMMERCIAL STATISTICS.

Articles.	Amount.	Value.	Vessels.	Number.	Average draft.	Average tonnage.
	Tons.				*Feet.*	
Coal	15,300	$70,500	Steam	10	5	12
Building material	22,775	143,000	Sail	70	6	70
Miscellaneous	1,500	7,500	Barges	243	6	100
	.....	.....	Rafts	4	.....	.....
Total	39,575	221,000	.....	327	.....	.....

The above table shows an increase in the commerce of 3,350 tons over that reported for calendar year 1891.

The project for the improvement was adopted in 1878, and provided for obtaining by dredging a channel 60 feet wide and 7 feet deep at high water from the mouth of the river to the head of navigation at an estimated cost of $25,530. This estimate was increased in 1882 to $43,160, the increase being due to advanced prices. It is still in force, though no appropriation was made from 1882 to 1890, in which latter year an allotment of $5,000 was made which was subsequently pledged under contract for continuing the work.

Up to June 30, 1892, $31,886.20 had been expended, and with this amount the channel had been dredged in 1883 to the required depth to within 1,000 feet of Broad Street bridge, but soon filled up. It was redredged in 1891.

There is now a channel from 30 to 50 feet wide from the mouth to Bridge Street bridge, the head of navigation, with mean high-water depths of from less than 5 to more than 7 feet. No work has been done during fiscal year.

The amount required to complete the improvement, $6,160, all of which should be expended in ensuing fiscal year.

MATTAWAN CREEK, NEW JERSEY.

Before its improvement by the United States this small stream was obstructed at its entrance into Keyport Harbor by a mud flat, on which the best depth at the worst section was 3.1 feet at mean low water, though the 3-foot channel was too narrow and tortuous for use. Above this flat a good 4-foot channel existed to $1\frac{1}{8}$ miles above the mouth, and thence to the steamboat dock at Mattawan 3.5 feet, shoaling to 1.8 feet at the freight dock, 600 feet above and $1\frac{7}{8}$ miles from the mouth. The range of the tide is 4.7 feet. Notwithstanding the above difficulties, it carried commerce valued in 1880 at $800,000.

The project for the improvement was adopted in 1881 and provides for dredging a channel 4 feet deep at mean low water and 100 feet wide from the mouth to Winkson Creek, and thence 75 feet wide to the railroad bridge at Mattawan, 250 feet above the freight dock, at an estimated cost of $33,120.

To June 30, 1892, the amount expended under this project was $23,485.87.

With this amount channels had been dredged in 1881 and 1882 to the required depth from the mouth to the freight dock at Mattawan, with widths varying from 100 to 30 feet, and, in 1891, a cut 35 feet wide was redredged to the required depth along the northerly side of the channel for a distance of 1,420 feet upstream from the mouth of the creek.

A survey made in 1892 shows that the channels have filled in and that the amount appropriated is not sufficient for completion.

If it is the intention of Congress to complete the improvement the sum of $10,000 can be expended profitably, as regards the efficient prosecution of the work, during the fiscal year ending June 30, 1895, and would be applied to redredging the channel.

The commerce for the calendar year 1892 is reported to be 326,500 tons, against 199,850 tons for 1891.

RANCOCAS RIVER, NEW JERSEY.

The Rancocas River discharges into the Delaware River at a point opposite the northern limits of the city of Philadelphia and about 12 miles above the foot of Market street. The project for its improvement was adopted in 1881, and proposed the formation of a channel from 150 to 200 feet wide, with a low-water depth of 6 feet from its mouth to Centerton, a distance of about 7½ miles, and from thence to Mount Holly a 5-foot low-water channel. The estimated cost of the improvement was $81,236.

The river and harbor acts of 1881 and 1882 appropriated $20,000 for the work, and this amount was expended between 1881 and 1884 in the improvement of Coats Bar, the most marked obstruction on the lower river.

The act of September 19, 1890, contained an appropriation of $250,000 for improving Delaware River, Pennsylvania and New Jersey, of which $10,000 "shall be expended in continuing improvement on the Rancocas River, one of the tidal tributaries of said river."

In 1891 and 1892, $10,000 was expended in the formation of a channel 6 feet deep at mean low water and about 100 feet wide at localities between the mouth and Centerton; in the removal of three wrecks lying between the railroad bridge at Delanco and the junction of the Lumbarton and Mount Holly branches of the river; and in the formation of a channel 25 feet wide and 4 feet deep at mean low water through the shoal areas between Centerton and Mount Holly, N. J.

The present condition of this improvement is as follows: A low-water channel 100 feet wide and 6 feet deep has been formed through the shoal areas between the mouth of the river and Centerton. In this channel there has been some shoaling, but the dimensions appear to be sufficient for the present necessities of navigation. A low-water channel 50 feet wide and 5 feet deep has been formed above Centerton for a distance of about three-fourths of a mile and a low-water channel 25 feet wide and 4 feet deep from thence to Mount Holly. The upper part of this channel has shoaled, so that its average depth is now about 3 feet. By this work about three-sevenths of the projected improvement has been completed, and the navigable conditions of the river have been proportionately improved.

Forty-six thousand dollars will complete the existing project, $12,000 of which could be expended in the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for years ending December 31, 1891 and 1892.

Kind of vessels.	1891.				1892.			
	Arrivals.		Departures.		Arrivals.		Departures.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
Steamers	490	101,587	490	101,587	490	101,587	490	101,587
Sailing vessels	1,820	95,677	1,820	95,677	1,820	95,677	1,820	95,677
Barges	925	147,362	925	147,362	971	154,730	971	154,730
Canal boats	1,570	122,821	1,570	122,821	1,648	128,962	1,648	128,962
Total	4,805	467,447	4,805	467,447	4,929	480,956	4,929	480,956

In the year 1892, 204,533 tons of freight, valued at $1,257,280, were received and shipped, showing an increase of 34,000 tons over that of 1890.

SHOAL HARBOR AND COMPTONS CREEK, NEW JERSEY.

Shoal Harbor is situated on the south side of Sandy Hook Bay, 5 miles west of the entrance to Shrewsbury River, New Jersey. The harbor is formed by a slight indentation in the shore line where Compton Creek empties into the bay. The outer harbor is unprotected by projecting headlands or other natural topographical features. The creek is used principally as a harbor for small vessels engaged in the fish and oyster trade and contains ample depth of water for this purpose, except at the entrance, which nearly runs dry at low water, thus preventing vessels from entering, excepting at or near high water.

A survey was made of this harbor and creek in 1883 from its mouth to a point about a quarter of a mile above, where a fixed bridge effectually bars further navigation.

The plan of improvement adopted in 1884 had in view the connection of the 5-foot mean low water curve of the creek on the inside with the 5-foot curve of the bay, by means of a dredged channel 150 feet wide, and the protection of this channel against shoaling by means of a timber dike placed on the west side of the harbor, at a total estimated cost of $64,130.

The amount expended to the close of the fiscal year ending June 30, 1892, was $5,000, with which the channel was dredged to a mean low-water depth of 4½ feet for a distance of 1,200 feet, beginning near the bulkhead at the mouth of the creek, with a width of 100 feet for the first 800 feet, and 70 feet for the remainder.

A survey made in October, 1892, shows that this channel has not maintained itself, having contracted to widths of from 60 to 80 feet and mean low-water depth from 3.2 feet to 4.2 feet.

An appropriation of $3,000 was made in the river and harbor act of July 13, 1892.

Amount estimated for completion, $56,130; $8,000 of which can be expended in ensuing fiscal year.

COMMERCIAL STATISTICS.

The following statistics relative to the commerce of Shoal Harbor and Comptons Creek, New Jersey, during the year ending December 31, 1892, were furnished by Capt. Benjamin Griggs, of Port Monmouth, N. J.:

Articles.	Amount.	Value.	Vessels.	Number.	Average draft.	Average tonnage.
	Tons.				*Feet.*	
Farm produce	35,000	$135,000	Steam	1	4	496
Coal	3,000	10,000	Sail.....	150	2	20
Clams and fish	10,000	25,000	.....	.....	.....	.....
Fertilizers	12,000	18,000	.....	.....	.....	.....
Miscellaneous	2,000	30,000	.....	.....	.....	.....
Total	62,000	218,000	.....	151	.....	.....

The above table shows an increase of 14,000 tons over calendar year 1891.

GOSHEN CREEK, NEW JERSEY.

This creek rises in central part of Cape May County and discharges into Delaware Bay about 15 miles north of Cape May. The stream can be ascended at low water in a small boat to a point about 4 miles from the mouth, and over this distance it flows through salt marshes which are but little above the level of high tide.

The village of Goshen is situated about half a mile from Goshen Landing, which is on the creek about 1¼ miles above the mouth. About twenty-five vessels of from 10 to 50 tons burden sail from Goshen Creek, and are engaged in a trade covering farm produce, coal, oysters, wood, and lumber. For the year 1892 the tonnage of these freights was reported at 5,025 tons, and the value $7,820. An excellent farming country is tributary to the commerce of the creek. The railroad is from 2 to 5 miles distant from this tributary area, and the removal of the obstructions to navigation from the stream would doubtless increase its commerce.

The creek carried a low-water depth of from 2 to 4 feet, with a least low-water width of 20 feet and a high-water width of 36 feet from Goshen to a point about 4,000 feet below; and from thence to the mouth, a distance of about 2,500 feet, a low-water depth of from 3 to 5 feet with a least width of 30 feet.

The project for its improvement, adopted in 1891, proposed the deepening and widening by dredging of the 4,000 feet of the creek below Goshen Landing to a low-water depth of 3 feet and a width of 30 feet; the formation of a dredged channel 3 feet deep and about 50 feet wide through the bar at the mouth to the limit of the sand beyond the low-water line, and the protection of the channel by a sheet-pile jetty.

The improvement was commenced during the fiscal year ending June 30, 1893, and $2,770.16 was expended in widening and deepening the channel to the proposed dimensions over a distance of about 3,975 feet below Goshen Landing. By this work about one-fourth of the projected improvement has been completed, and the navigable conditions have been proportionately improved.

The sum of $9,000 will be required to complete the improvement, all of which could be expended in the ensuing fiscal year.

SALEM RIVER, NEW JERSEY.

Salem River discharges into the Delaware River by its natural mouth at a point about 4 miles below Fort Delaware. At a point in the Delaware River about 10 miles above the natural mouth of the Salem River a canal was constructed by private enterprise, which connects with the Salem River at the point of its nearest approach to the Delaware. Just below the junction of this canal with Salem River a dam has been built across the latter stream which essentially divides the river into two parts, viz, from the natural mouth to the dam, and from the mouth of the canal to the headwaters of the river.

In its original condition the channel of the Upper Salem River carried about 3 feet at mean low water over the bar, from 5 to 11 feet through the canal, and about 3 feet to Hoxies Bridge.

The original project for its improvement was adopted in 1881. It provided for the removal of a shoal near Biddles Landing at an estimated cost of $4,500. The work done in 1881 and 1882 resulted in the formation of a channel 60 feet wide and from 6 to 7 feet deep at mean low water from the head of the canal to a point about 200 feet above Biddles Landing, leaving about 700 feet to be improved. On account of shoaling, it was then estimated that the completion of the improvement would cost from $4,000 to $6,000.

No work has been in progress since 1882 until the past fiscal year.

The sum of $2,500 in the last river and harbor act was restricted to the improvement above the canal.

Recent surveys show that there has been extensive shoaling in the channel, and it is believed that the improvement will only be temporary.

Amount (estimated) required for completion of existing project, $1,700. Amount that can be profitably expended in fiscal year ending June 30, 1895, $1,700.

The amount of freight received and shipped during the year 1892 was 18,750 tons, valued at $103,185, and the arrivals and departures of vessels were 369 each.

ALLEGHENY RIVER, PENNSYLVANIA.

The Allegheny, rising in Potter County, Pa., makes an extensive northerly détour into the southern part of New York State, and thence returning to its original State unites with the Monongahela at Pittsburg, forming by this confluence the Ohio River. The length of the Allegheny is nearly 350 miles, of which about 200 is navigable. It flows through a hilly country, rich in deposits of coal, petroleum, iron ore, and the products of the forest, and naturally its commerce is extensive and well sustained.

Commerce.

Articles.	Quantities.	Articles.	Quantities.
	Tons.		*Tons.*
Barges	4,860	Lath	575
Bark	3,215	Manure	8,325
Barrels	900	Nitroglycerine	1
Boat bottoms	28,656	Piles	4,113
Brace poles	688	Pit posts	5,437
Cattle and horses	286	Rough lumber	92,692
Check posts	1,205	Sand	64,099
Coal	195	Shingles	400
Fire clay	3,120	Staves	525
Gas pipe	450	Stone	18,579
General freight	1,928	Timber	104,013
Gravel	10,332		
Hay	300	Total	354,894

Passengers carried, 4,627.

The total amount appropriated for this river is $205,000, and by the expenditure of this sum navigation has been greatly benefited.

The log chute at Corydon is in good order; the dams at Cornplanter Island and Pithole are likewise in good condition; the dams at Hickory, Red Bank, and Nicholsons Island have been slightly damaged by ice.

The bar at Pithole Ripple has been removed. This was one of the worst obstructions in the river, and by its removal navigation has been greatly benefited.

The engineer in charge of this work recommends an appropriation of $25,000 for the ensuing fiscal year.

DELAWARE RIVER, PENNSYLVANIA AND NEW JERSEY.

The Delaware forms the entire boundary between New Jersey and Pennsylvania, and its entire length is estimated at 350 miles. The tide ascends to Trenton, N. J., about 130 miles from the sea, which is the highest point on the river reached by steamboats. Its chief commercial importance lies in the fact that it forms a connecting link between the port of Philadelphia and Delaware Bay and the Atlantic Ocean.

COMMERCIAL STATISTICS.

Comparative statement of gross tons and values of exports, imports, and revenue collected.

Year.	Exports.		Imports.		Revenue.
	Gross tons.	Value.	Gross tons.	Value.	
1888	780,644	$28,012,879	1,016,909	$45,020,132	$20,569,684
1889	851,933	31,403,720	1,108,660	50,996,802	22,612,956
1890	1,502,771	36,462,951	1,424,102	56,057,011	27,572,351
1891	1,540,966	42,845,724	1,381,871	62,438,219	11,121,320
1892	2,359,145	60,274,024	1,429,636	63,277,781	10,886,475

Foreign entrances and clearances.

Class.	Entered from foreign ports.				Cleared for foreign ports.				Total.	
	With cargoes.		In ballast.		With cargoes.		In ballast.			
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
American steam vessels	44	82,606	3	2,217	39	79,004	10	6,622	96	170,449
American sail vessels	345	180,884	9	10,001	283	164,445	1	366	638	355,696
Foreign steam vessels	700	923,502	246	399,528	682	1,058,613	136	83,446	1,764	2,465,089
Foreign sail vessels	214	120,748	57	65,771	264	196,606	15	6,623	550	389,748
Total	1,303	1,307,740	315	477,517	1,268	1,498,668	162	97,057	3,048	3,380,982

Domestic and coastwise commerce.

	Tons.	Value.
Received	4,337,210	$77,306,851
Shipped	6,446,302	92,507,779
Passengers arriving at Philadelphia	1,077,244	
Passengers departing from Philadelphia	1,095,498	

Up to the year 1885 the efforts to improve the river between Philadelphia and the bay were confined to dredging, except at Schooner Ledge, where solid rock was removed, under appropriations for special

localities, and also under general appropriations for the Delaware River below Bridesburg.

A board of engineers, convened by direction of the Secretary of War for the purpose of considering the subject of the permanent improvement of Delaware River and Bay, recommended under date of January 23, 1885, the formation of a ship channel from a point opposite Philadelphia and about midway between the American Shipbuilding Company's yard and the Gas Trust wharf to deep water in Delaware Bay, having a least width of 600 feet and a depth of 26 feet at mean low water. The formation of such a channel is to be obtained, except at Schooner Ledge, where rock would require to be removed, by regulating the tidal flow by means of dikes, with recourse to dredging, where necessary, as an aid to such contracting and regulating works. The estimated cost of obtaining a channel of the above dimensions is about $2,425,000, which covers the estimated cost of the permanent improvement of the Delaware River between the upper part of Philadelphia and deep water in the bay. This estimate of cost does not include the improvement of Philadelphia Harbor, which is a separate project. With the present requirements of commerce above Philadelphia, it is not considered that the part of the river lying between Trenton and Bridesburg demands any further improvement.

The entire amount expended on the improvement of the Delaware River from 1836 to June 30, 1892, under appropriations both for special localities and the general river, was $2,080,721.76, of which $118,500 was expended on that part of the river between Trenton and the upper part of Philadelphia. As a result of this expenditure there had been formed at the latter date a channel of navigable width and 7½ feet deep at mean low water through the bars between Bridesburg and Bordentown; a channel across Kinkora Bar 7½ feet deep; a channel across Five Mile Bar from 200 to 300 feet wide and from 12 to 15 feet deep; a channel from 200 to 400 feet wide and from 24 to 26 feet deep through the shoal areas at Port Richmond; a channel across Mifflin Bar from 200 to 350 feet wide and from 24 to 25 feet deep; a channel through Schooner Ledge 330 feet wide and 24 feet deep, except over a small area recently discovered, where the depth is reduced to 23 feet at mean low water; a channel through Cherry Island Flats from 200 to 450 feet wide and from 23 to 24 feet deep, and a channel across Bulkhead Shoal from 100 to 370 feet wide and from 24 to 26 feet deep.

The channel between Philadelphia and Camden across Smith Island Bar had been improved by the formation of a dredged cut protected by revetment, so as to give a channel 100 feet wide, with a minimum depth of 6 feet at mean low water.

During the fiscal year ending June 30, 1893, the sum of $83,103.97, which includes the liabilities outstanding June 30, 1892, was expended in surveys, examinations, the repair of the dike at Bulkhead Bar, and dredging at Cherry Island Flats, making a total expenditure since 1836 of $2,163,825.73, of which $811,825.73 has been expended on the present project.

The changes during the past fiscal year are summarized as follows:

The dredged channel across Kinkora Bar has shoaled, the minimum depth at mean low water being now about 7½ feet. At Five Mile Bar the dike has formed a channel from 12 to 15 feet deep at mean low water and 200 feet wide. At Mifflin Bar the channel has shoaled, the greatest depth being 24.4 feet at mean low water, with a minimum width of 150 feet. At Cherry Island Flats a channel has been dredged 200 feet wide and 26 feet deep at mean low water. At Bulkhead Bar

the channel has a depth of 24 feet at mean low water with a least width of 450 feet, and a depth of 26 feet at mean low water with a least width of 250 feet and favorable changes are in progress.

The available funds will be applied to the improvement of the channel at Cherry Island Flats and Schooner Ledge.

Amount estimated to complete the existing project, $1,475,000, of which amount $500,000 can be profitably expended in fiscal year ending June 30, 1895.

SCHUYLKILL RIVER, PENNSYLVANIA.

The Schuylkill River, after flowing through the cities of Pottsville, Reading, Phœnixville, and Norristown, Pa., enters the Delaware River at the southern limit of Philadelphia, which is built on both shores of the river, and the present demands of commerce limit the requirement of an improved river channel to that part of the river lying between the mouth and Gibson Point, or the lower 4 miles of the river. At Girard Point are located large grain elevators and wharves. At Gibson Point and Point Breeze, which are near each other and closely related as to commercial requirements, are the large storage tanks and wharves of the petroleum oil refineries. The interests assembled at these three points cover mainly the commerce of the Schuylkill River, and both the grain and oil trade require deep-draft vessels for the proper and economical transaction of their business.

COMMERCIAL STATISTICS.

Vessel movement.

Class.	1891.		1892.	
	Number arriving loaded.	Number departing loaded.	Number arriving loaded.	Number departing loaded.
Steamers	912	1,168	610	1,076
Sailing vessels	580	287	665	272
Barges and canal boats	3,128	870	2,870	1,108
Total	4,620	2,325	4,145	2,456

Fifty-seven vessels had a registry of 2,000 to 2,800 tons. Five hundred and thirteen vessels were reported as drawing 18 to 27 feet of water. The drafts given are for the full loads in the Delaware River, just before entering and just after leaving the Schuylkill. Thirty-five barges and lighters conveyed portions of inbound cargoes from the Delaware up to the Schuylkill, and 198 barges and lighters conveyed portions of outgoing cargoes from the Schuylkill to the Delaware, owing to insufficient depth of water in the Schuylkill River for the deep-draft vessels.

During 1892, 854,588 tons of freight were received, valued at $2,898,457, and 1,309,955 tons shipped, valued at $23,821,009.

When the work of improvement was commenced in 1870 there was a channel of entrance into the mouth of the river carrying a depth of only 10 feet at mean low water.

The original project under which work was commenced in 1870 proposed the formation of a channel 100 feet wide, with a depth of 20 feet from the mouth of the river to Gibson Point, about 4 miles, and a depth of 18 feet from thence to Chestnut street bridge, in Philadelphia, about 3 miles.

In 1875 and 1883 this project was amended so as to increase the low-water channel between the mouth and Girard Point, a distance of about

1 mile, to 400 feet wide and 24 feet deep, and from Girard Point to Gibson Point, about 3 miles, to 250 feet wide and 20 feet deep. In 1892 the project was again modified so as to provide for the construction of dikes to maintain a navigable depth at the mouth. The estimated cost of the entire improvement is $529,959.

The amount expended upon this project to June 30, 1892, was $415,031.78. This work had resulted in the formation of a channel about 100 feet wide and from 18 to 20 feet deep at mean low water across the bar at the river's mouth; a channel about 250 feet wide and from 20 to 24 feet deep from inside the bar to Point Breeze, except at Yankee Point, where the width is 300 feet; and from Point Breeze to Gibson Point, a channel from 100 to 200 feet wide and from 18 to 20 feet deep; from thence to Chestnut street bridge a channel of navigable width, and from 17 to 20 feet deep.

The depth of the channel has increased opposite the upper end of the pile dike, but the dike has not been sufficiently extended to produce any decided effect upon the bar. It is proposed to apply available funds to dike construction and to dredging, if found necessary.

Amount (estimated) required for completion of existing project, $44,959; amount that can be profitably expended in fiscal year ending June 30, 1895, $44,959.

DAM AT HERRS ISLAND, ALLEGHENY RIVER, PENNSYLVANIA.

The object of this dam is to extend navigable water up the Allegheny, from the head of the pool of the Davis Island Dam to the city limits, thus completing the improvement of the harbor of Pittsburg, and providing the means for the cheap transfer of freights at all seasons. This dam will also be the first step toward the radical improvements of the Allegheny River, a work that promises most valuable results.

The original project was for a fixed dam, but in compliance with the request of the authorities of Pittsburg and Allegheny City the Secretary of War has ordered that the dam at Herrs Island be made a movable one. This change in design necessitated a corresponding change in the estimated cost of the work. The estimate made by the late Lieut. Col. William E. Merrill was $600,000.

Much delay in commencing the work was caused by suits brought by the riparian owners, but by a change of location, so that the lock was placed out 55 feet from the bank to provide a passageway, the riparian owners were satisfied and their opposition was withdrawn. The land necessary for the lock and dam has been acquired and all legal questions as to damages to adjoining property settled. Observations of the current and water levels have been taken and borings made for the purpose of determining the character of the river bed. Preparations have been made and material obtained for the construction of the cofferdam for the lock, which will be built during the low-water season.

Amount required to complete existing project, $484,500, of which amount $200,000 can be expended in ensuing fiscal year.

APPOQUINNIMINK RIVER, DELAWARE.

This river is a tributary of Delaware Bay, flowing mainly in New Castle County, Del., and is navigable at low tide for vessels of light draft, from the mouth to Odessa, a distance of about 9 miles. The bar at the mouth is navigable only at high water.

A survey of the stream was made in accordance with the requirements of the river and harbor act of August 11, 1888.

The plan of improvement adopted in 1890 is to dredge a channel 8 feet deep at mean low water, 100 feet wide within the section of the river between the mouth and Townsend's wharf, a distance of 5 miles, and 80 feet wide in the remaining section as far as the bridge at Odessa.

The estimated cost of improvement is $39,963.

Ten thousand dollars has been appropriated for this improvement.

At the close of the fiscal year ending June 30, 1892, the sum of $4,963.72 had been expended by dredging in the upper river, resulting in a greatly increased harbor space at the town of Odessa.

During the past fiscal year an additional length of 4,487 feet of channel was improved, extending it to a point 6,762 feet below Odessa bridge.

The amount required for completion of existing project, $29,963, $10,000 of which could be expended in fiscal year ending June 30, 1895.

MONONGAHELA RIVER, WEST VIRGINIA.

This river is formed a short distance above Fairmont, W. Va., by the union of the Tygarts Valley River with the West Fork, and empties into the Ohio at Pittsburg, Pa. Originally the river was unnavigable, excepting at certain stages of water. The lower river was improved by the Monongahela Navigation Company, who built seven dams, four with double locks and three with single locks. The United States have constructed two additional locks with dams, numbered 8 and 9, extending slackwater to Morgantown, W. Va.

Eighty-eight miles of this river is under the control of the Monongahela Navigation Company, and 14 miles under the United States.

The project under which this work is proposed to be continued is that recommended in the report on a survey in 1875, and calls for the construction of six more masonry locks and dams, extending slackwater several miles above Fairmont, in order to reach the heavy deposits of excellent coal on the West Fork. The original estimate for this work was $780,000.

In 1888 a survey was ordered, and in the report thereon the estimate is increased to $1,200,000.

The river and harbor act of July 13, 1892, appropriated the sum of $25,000 for the extension of the improvement on Monongahela River by beginning work on an additional lock and dam, which is designated as No. 10, and during the past fiscal year a survey has been made for the purpose of determining the exact location of this lock, which will be near Morgantown, W. Va.

Amount that can be profitably expended in fiscal year ending June 30, 1895, $100,000.

COMMERCE.

The commerce during 1892 on the 14 miles of the Monongahela River which is controlled by the United States is as follows:

Tons of freight	20,707
Passengers	18,298

The commerce on the lower part of this river is as follows:

Tons of freight	4,163,304
Passengers	80,590

Increase in tonnage and number of passengers carried on the 14 miles of the Monongahela River, which is controlled by the United States, for the calendar year ending December 31, 1892.

Calendar year.	Tonnage.	Passengers.
1891	19,486.90	16,786
1892	20,707.07	18,298
Increase 1892	1,221.07	1,512

No new lines of transportation were established during the year.

SMYRNA RIVER, DELAWARE.

Before improvements began, in 1879, there was a minimum depth of 2½ feet inside the creek and 4 feet over the bar at the mouth. Navigation was possible only at high tide, and was carried on by one steamer and seven small schooners.

In 1878 a project was made for the improvement of the whole river, which included also a plan for deepening the channel across the bar at the mouth. By special direction of Congress the improvement of the bar was commenced first, and during the following four years three appropriations, aggregating $10,000, were made and expended in dredging a channel across the bar 100 feet wide and 8 feet deep at mean low water. This channel soon filled up again.

A new project was submitted in 1887 for a 7-foot low-water channel 60 feet wide inside the river and 100 feet wide across the bar at the mouth, the latter channel to be protected on each side with stone jetties. The estimated cost of the project was $90,698.40.

The portion of the project relating to dredging has been adopted.

At the close of the fiscal year ending June 30, 1892, the sum of $17,143.96 had been expended in dredging inside the river. At that date a channel had been dredged 40 feet wide and 6½ feet deep, at mean low water, between Smyrna Landing, the head of navigation, and Eagle Nest Landing, about 5 miles below.

The improved channel has been the means of bringing navigation 2 miles nearer the town of Smyrna, resulting in a reduction of freight rates and in the time of transporting freight to and from the town.

The amount asked for, if appropriated, will be expended in dredging, in pursuance of the project now in force.

Amount estimated to complete the present project $19,365, of which amount $10,000 can be profitably expended in ensuing fiscal year.

COMMERCIAL STATISTICS.

Receipts and shipments.

Class.	Tons.	Value.
Receipts:		
Bone, coal, iron, phosphate, rock, and ice	6,700	$88,000
Grain, truck, hay, potatoes, live stock, etc	22,901	294,750
Chemicals, canned goods, fertilizers, etc	8,522	207,000
General merchandise	10,000	400,000
Total	48,123	989,750
Shipments:		
Cordwood railroad ties, and ship timber	73,572	209,000
Baskets, brick, canned goods, crates, etc	120,433	949,000
Fruit, truck, grain, hay, poultry, cattle, etc	23,466	1,077,150
General merchandise	5,000	200,000
Total	222,471	2,435,150
Total receipts and shipments	270,594	3,422,900

Vessels trading in Smyrna River, Delaware.

Class.	No.	Aggregate tonnage.	Draft.	Trips.
			Feet.	
Steamers	4	560	5 to 6	Daily three months and triweekly balance of year.
Tugboats	5		4 5	Charter.
Schooners	4	200	4 5	Do.
Sloops				Irregular.

MURDERKILL RIVER, DELAWARE.

Murderkill River is a tidal stream and flows through Kent County, Del., in a general northeasterly direction into the Delaware Bay.

The present head of navigation is at the town of Frederica, 9 miles from the mouth of the river; tidal influence, however, extends to a point 6½ miles above that town. The rise and fall of the tide is 3.83 feet at the mouth of the river and 1.08 feet at Frederica. The two lower miles of the river have an average width of 150 feet and an average depth of 7.8 feet. The remaining portion of the river up to Frederica has a uniform average width of 90 feet and an average depth of 6.2 feet in the channel. Since 1820 the bends in the river have at various periods been connected by canals of narrow widths, dug by private parties, to avoid certain hard shoals within the original course of the river and to shorten the distance. The length of the bends thus cut off is 4.2 miles. The mouth of the river is obstructed by a sand bar, nearly dry at low water, which threatens to close the river entirely.

The project for improvement, proposed in a report on a survey made in 1891, provides for a channel 7 feet in depth at mean low water, 80 feet in width from Frederica. which is at the head of navigation, to the mouth of the river, and 250 feet in width on top and 150 feet in width at the base to the 7-foot depth in Delaware Bay, the cut at the mouth to be protected by forming an embankment of the dredged material on each side to a height of at least 2 feet above high spring tides, the estimated cost being $47,550.

An appropriation of $7,000 was made by the river and harbor act approved July 13, 1892, for this improvement.

A contract has been made for dredging a cut 60 feet wide and 5 feet deep along the line of the proposed channel at the mouth, and on June 28, 1893, operations were begun. At the close of the fiscal year 220 feet of the cut had been dredged and 2,350 cubic yards of materials had been removed.

Amount estimated to complete existing project, $40,550, of which amount $10,000 could be profitably expended in ensuing fiscal year.

The commercial statistics for 1892 have not yet been received.

BROAD CREEK RIVER, DELAWARE.

This river is a tributary of the east fork of the Nanticoke River, and rises in Cypress Swamp, in the lower part of Sussex County, Del. Its navigable length is about 7 miles, and its course is due west. It has been under improvement by the General Government since 1881 and is, therefore, not a new work. The original project under which improvements were carried on since that year was based upon a survey made in 1879. The project was completed in 1889, a channel having been made 50 feet in width and 6 feet deep at mean low water from a point

near Bethel, Del., to Laurel, Del., at the head of navigation, a total distance of about 3 miles. The total amount expended was $35,008. The original depth of water at low tide was only 2 feet at Laurel and only 1½ feet below this town.

The remarkable growth of the town of Laurel is attributed to the increase in commerce on the river, resulting from the improvements made in the channel. Its population has increased from 1,180 in 1880 to 2,367 in 1890. The value of real estate in the town has increased 400 per cent; that of property along the river front 500 per cent since the river has been improved.

The project for improvement proposed in a report upon an examination made to comply with requirements of the river and harbor act approved September 19, 1890, provides for dredging a channel 70 feet wide and 8 feet deep at mean low water from Bethel to the head of navigation at Laurel, at an estimated cost of $15,000.

An appropriation of $5,000 for this work was made by the river and harbor act approved July 13, 1892.

A channel of the approved dimensions, 70 feet wide and 8 feet deep at mean low water, was dredged for a distance of 6,455 feet, beginning at a point 1,000 feet above the bridge at Bethel and ending 680 feet above Hitchs upper wharf. An additional cut, also 8 feet deep but only 40 feet wide, was dredged for a length of 215 feet across a shoal situated just beyond the section of the channel that had been dredged to the full width.

Amount (estimated) required for completion of existing project, $10,000; amount that can be profitably expended in fiscal year ending June 30, 1895, $10,000.

MISPILLION RIVER, DELAWARE.

Mispillion River forms part of the boundary between Kent and Sussex counties, Del. It is a narrow and rather tortuous stream about 18 miles long, and flows into the Delaware Bay about 17 miles north of Cape Henlopen.

The river from Milford to the mouth has been improved by the General Government between the years 1879 and 1889, and $17,000 has been expended in making a channel 40 feet wide and 6 feet deep at mean low water.

The entrance to the river is obstructed by shoal mud flats projecting nearly 1 mile from the shore. Vessels can only enter and depart at high water.

The demands for an improved outlet for the river have special merits. The local shipping interests are very great, considering the size of the river. The industry in shipbuilding at Milford deserves recognition. About 12 vessels are built there annually, and more and larger vessels would be built if they could get them out of the river without difficulty. The commerce of the river is not given for 1892; below is that found in the last report.

There are 17 sailing vessels owned by parties living on the Mispillion River, of a total of 1,600 tons burden; the smallest, of 40 tons, has a draft of water of 4 feet; the largest, a 200-ton schooner, draws 7 feet of water. Ten of these vessels trade regularly between points on the river and Philadelphia, and the remaining 7 sail regularly to and from New York. Quite a number of transient vessels carry freight in and out of the river. The shipments and receipts by water, consisting principally of lumber, railroad ties, cord wood, grain, canned goods,

lime, fertilizers, coal, iron, and general merchandise, amounted during the past year to 44,315 tons, valued at $916,250. All these vessels are subject to long delays at the mouth of the river, where the depth of water over the bar is only 1½ feet at mean low tide.

The project for improvements at the mouth of the river, proposed in a report on a survey made in 1891, provides for a cut across the flats in a southeasterly direction, having a width of 150 feet and a depth of 6 feet at mean low water, beginning opposite the light-house and ending in deep water in the bay; the cut to be protected on the upper or north side by a bank made of excavated material. The estimated cost is $24,000.

An appropriation of $12,000 for this work was made by the river and harbor act approved July 13, 1892.

During the past fiscal year a contract has been made for dredging about 80 feet in width of the proposed cut. Dredging was begun in May, but owing to the strong currents inside the mouth of the river and the live condition of the dredged material the contractor was unable to maintain a proper depth in the cut made, and the Department authorizes a temporary suspension of work until some protective works could be built. Six thousand eight hundred and twenty-nine cubic yards of material was removed in the attempt to begin the cut.

Twelve thousand dollars is estimated for the completion of the existing project, all of which can be profitably expended in the ensuing fiscal year.

INLAND WATERWAY FROM CHINCOTEAGUE BAY, VIRGINIA, TO DELAWARE BAY, AT OR NEAR LEWES, DEL.

This improvement is designed to form an inland navigation route, about 75 miles in length, between Chincoteague Bay, Virginia, and Delaware Bay, at or near Lewes, Del.

The project adopted in 1886 contemplates an open channel 70 feet wide at the bottom and 6 feet deep below the mean low-water level established in the Delaware Breakwater Harbor, beginning in Chincoteague Bay and following approximately deep water in Synepuxent, Isle of Wight, and Assawoman bays; thence across the country for about 4 miles between Little Assawoman Bay and Indian River Bay into and along the latter bay and up Rehoboth Bay; thence from the head of Rehoboth Bay across the intervening high land, for a distance of about 8 miles, to Delaware Bay. The originally estimated cost of the improvement was $350,000. There are several shoals within the bays named where the depth of water is only 2½ feet. The amount of commerce that will be created by this improvement is estimated at $2,000,000 per annum.

This project was modified in 1892 as far as it relates to the section of the waterway situated between Rehoboth Bay and Delaware Bay in reducing the width at the bottom to 20 feet.

Up to the close of the fiscal year ending June 30, 1892, $67,932.87 had been expended. Little Assawoman and Indian River bays had been connected by a cut 20 feet wide and 4 feet deep, over which 3 temporary wooden bridges, provided with draws, were constructed. The location of the line of the canal across the mainland between Rehoboth Bay and Delaware Bay had also been approved after the extensive surveys had been made and proceedings to obtain the necessary land were in progress.

During the last fiscal year the appropriations of $50,000 and $25,000,

made September 19, 1890, and July 13, 1892, respectively, were made available, the requirements of the law having been complied with, the State of Delaware giving the right of way for the canal to the United States free of cost to the latter.

A project for the expenditure of the available funds was submitted in January, 1893, which was approved. Twice the proposed work has been advertised, but as the bids received were considered unsatisfactory or too high, they were all rejected, and new bids were invited at the close of the fiscal year.

The portion of the waterway already excavated is in fair condition, and is used by small vessels trading between Chincoteague Bay and Rehoboth Bay. As there is yet no safe outlet at the upper end of the route, the commerce just developing is still limited.

To complete the existing project will require $206,250. One hundred thousand dollars could be profitably expended in ensuing fiscal year.

COMMERCIAL STATISTICS.

There has been no change in the commerce and navigation since last annual report, which was as follows: Total receipts and shipments, 1,493 tons; value, $17,387; number of vessels using the waterway, 10; aggregate tonnage, 64.

CHOPTANK RIVER, MARYLAND.

At the time the project for the improvement of this river was made, the depth of water between Denton and Greensboro varied from 2 to 8 feet at low water. Navigation by small sailing vessels extended to a landing 3 miles above Denton, called "The Stakes." Lighters were necessary for the transportation of freight beyond that point to Greensboro, a further distance of 4 miles.

A project for improvement was made in 1880 for an 8-foot low-water channel 75 feet wide, the estimated cost being $79,000. The project was adopted the same year. Since that time the channel has been dredged at various points to depths of 6, 7, and 8 feet, and for a width of 40 feet only. Up to the close of the fiscal year ending June 30, 1892, $37,795.28 had been expended between Denton and Greensboro, resulting in a continuous channel not less than 40 feet wide and over 5 feet deep, except a section $1\frac{3}{4}$ miles in length, which had previously been dredged to 5 feet only.

During the past fiscal year $10,204.72 was expended. The channel was widened to the approved width of 75 feet, beginning at Greensboro and ending near the Brick Mills, a distance of about 4 miles. At such points where the existing depth was less than 8 feet the dredging was done to $7\frac{1}{2}$ feet at mean low water. The dredged channel shows no signs of deterioration. During the past six years a steamboat has run regularly between Baltimore and Greensboro.

Twenty thousand dollars will be required to complete the existing project, $10,000 of which could be profitably spent in the fiscal year ending June 30, 1895.

COMMERCE.

Two thousand one hundred and sixty-three tons of freight, valued at $36,775, was received, and 14,333 tons, valued at $101,669, was shipped. One vessel, carrying on an average 175 tons, made weekly trips during the year.

SUSQUEHANNA RIVER, MARYLAND.

Before improvements were commenced in this section of the river the least depth of water over two shoals which were then in existence between the light-house at Havre de Grace and Specutia Island, below, was 5 feet at mean low water. The channel between Watson Island and a large shoal on the west shore was very narrow and occasioned many serious ice gorges at and near Port Deposit.

The improvements have been in progress since 1852. The present general project is for a 15-foot low-water channel below Havre de Grace and for the removal of the shoal opposite Watson Island to a depth of 8 feet below mean low water.

The channel below Havre de Grace was dredged the last time in 1885 to a depth of 12 feet; it has shoaled again. The channel west of Watson Island has been widened, by dredging, about 400 feet, but the shoal which was removed has nearly entirely re-formed since the discontinuance of work in 1889. At the close of the fiscal year June 30, 1892, $158,687.65 had been expended in these improvements.

During the winter of '93 the ice was unusually heavy in the Susquehanna River and of long duration. During the latter part of January four distinct gorges had formed at the mouth: One across the main channel, opposite Havre de Grace; one at the head of Watson Island; a third on the eastern bank at Mount Ararat, and the fourth at Port Deposit. Above this town the ice was piled 30 feet above the ordinary level of the river, and, in consequence, all the islands above were submerged, notwithstanding the fact that the stage of water was very low. The gorges disappeared gradually during February without doing much damage.

There were no operations during the fiscal year ending June 30, 1893. A report on the survey of the river in this locality was submitted December 26, 1891, with estimates for a new project. This project was not approved of by the chief engineer, as the works would not guarantee protection.

It is estimated that $20,000 will be required for dredging annually, and that all of this amount could be expended in fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

Receipts and shipments for year ending December 31, 1892.

Class.	Tons.	Value.	Class.	Tons.	Value.
Coal and ice	467,162	$1,335,924	Canned goods, fish, barrels, etc.	6,435	147,400
Lumber, shingles, and timber	15,575	119,175			
Stone, sand, and ground flint	12,400	47,000	General merchandise	32,738	422,875
Fertilizers	6,000	120,000			
Hay and grain	1,274	27,100	Total	541,584	2,219,474

CHESTER RIVER, MARYLAND.

Chester River is one of the largest rivers of the Eastern Shore of Maryland, and enters Chesapeake Bay from the east. It is 40 miles long and entirely a tidal stream. The commerce of the river is quite brisk within the lower 25 miles and as far as Chestertown, the channel

being nowhere less than 10 feet deep and of ample width. The channel depth above Chestertown gradually decreases until it is only 6 feet near Crumpton, a small village 33⅓ miles above the mouth, and the present terminus of steamboat navigation. A few small sailing vessels sail occasionally from a wharf about 4 miles above Crumpton; but beyond that point navigation is interrupted by many shoals, with only 3 and 4 feet of water over them.

The existing project for improvement is for a 6-foot low-water channel, 60 feet wide, from Crumpton to Jones Landing, a distance of 6¼ miles, at an estimated cost of $12,750.

Up to the close of the fiscal year ending June 30, 1892, $3,088.58 had been expended, resulting in improving the existing channel for about 4 miles above Crumpton, by dredging a number of shoals which obstructed the channel.

During the past fiscal year the channel was dredged for an additional length of 3,083 feet, and about 1½ miles of the river remains to be dredged. A number of sailboats carrying grain and other farm products have commeneed to make regular trips from the head of the improved channel.

The completion of the remainder of the channel will be of grea benefit commercially.

Four thousand seven hundred and fifty dollars will complete the improvement, this being the amount asked for by the engineers, to be expended in ensuing fiscal year.

COMMERCIAL STATISTICS.

Receipts and shipments.

Class,	Tons.	Value.
Receipts:		
Fertilizers	497	$19,880
General merchandise	343	17,150
Total	840	37,030
Shipments:		
Grain	2,678	66,938
General merchandise	292	14,600
Total	2,970	81,538
Total receipts and shipments	3,810	118,568

It is estimated that there will be a saving of from 20 to 25 per cent in freight rates and a similar reduction in passenger rates, by the completion of this improvement.

MANOKIN RIVER, MARYLAND.

Manokin River is a tidal stream and flows through Somerset County, Md., into Tangier Sound, Chesapeake Bay. The length of the stream from Princess Anne, the head of navigation, to the junction with the sound is about 18 miles. Before improvements were commenced, the depth of water at the mouth of the river at "Mud Flats" was between 1 and 2 feet at low tide. These flats are nearly 3 miles wide and made navigation, except at high water, impossible, thereby rendering the upper part of the river, which has a fair depth and width, useless for shipping purposes.

The adopted project for improvement is for a channel 6 feet deep at mean low water and 100 feet wide from Locust Point to Sharp Point, embracing the section called the "Mud Flats," at an estimated cost of $30,000.

Up to the close of the fiscal year ending June 30, 1892, $7,370.92 had been expended and the proposed cut across the mud flats had been made for a width of 30 feet and to a depth of 5 feet at low tide, which opened the river for navigation during low tide.

During the past fiscal year an additional cut, 30 feet wide, was dredged, adjoining the first cut at the mud flats, and this cut and portions of the old cut which had shoaled were made 6 feet deep at mean low water. Several sharp points in the upper river, above Sharp Point, were also removed and navigation upon the whole river at low tide was thereby greatly facilitated.

Fifteen thousand dollars will be required to complete the improvement, $10,000 of which could be profitably expended in ensuing fiscal year.

COMMERCIAL STATISTICS.

The total receipts and shipments of freight for the year 1892 were 174,891 tons, valued at $3,945,914.

Besides 1 steamer of 4 feet draft making daily trips, there are about 300 schooners, sloops, pungies, etc., engaged in the coastwise trade sailing from the river.

Vessels are now loading at Prince Anne wharf almost daily, which was almost unknown before dredging. The increase in shipments of fruits this year has been 50 per cent.

WICOMICO RIVER, MARYLAND.

The Wicomico River flows in a southwesterly direction through Wicomico County, Eastern Shore of Maryland, and is a tributary of Chesapeake Bay, entering the head of Tangier Sound from the east.

The original depth in the river near Salisbury was 18 inches at the time improvements commenced in 1872. Under a project made that year and completed in 1885, a channel 7 feet deep and 75 feet wide, afterwards increased to 100 feet, was dredged at and below Salisbury and $50,000 was expended. Marked benefits to navigation and commerce were derived from the improvement.

The present project for improvement, necessitated by the increased business of the port, was submitted in a report upon a survey of the river made in 1889, and was adopted in 1890. It provides for a channel 9 feet deep at mean low water and 100 feet wide from near Fruitland Wharf to the drawbridge at Salisbury, a distance of nearly 2 miles, at an estimated cost of $23,200.

Up to the close of the fiscal year ending June 30, 1892, $10,188.10 had been expended and a cut about 30 feet wide and 9 feet deep had been dredged for a distance of 9,250 feet, which was of great benefit to the larger schooners which enter the river.

Nothing was done during the past fiscal year. A contract, to be completed by May 30, 1894, has been made for the expenditure of the available funds.

Amount estimated to complete the existing project is $6,700, all of which could be profitably expended in ensuing fiscal year.

COMMERCIAL STATISTICS.

Commercial statistics were asked for but full returns have not been received. The Maryland Steamboat Company furnished the following:

Letter from Mr. James E. Byrd, secretary of the Maryland Steamboat Company.

BALTIMORE, *June 29, 1893.*

DEAR SIR: Replying to your favor of 28th instant, I beg to advise you that we have the steamer *Joppa* making triweekly trips between Baltimore and Salisbury, Md. Steamer draws 6 feet 6 inches loaded and is of 607.54 gross tons burden.

I estimate the amount of freight handled yearly to be 16,653 tons.

Yours, truly,

JAMES E. BYRD,
Secretary.

Gen. WILLIAM F. SMITH.

LA TRAPPE RIVER, MARYLAND.

La Trappe River, formerly named Dividing Creek, is in the lower section of Talbot County, Eastern Shore of Maryland, and is a small tidal tributary of the Choptank River, about 3 miles long. The channel within the river proper is fairly straight, and has a least depth of 8 feet at mean low water; the channel at the mouth, however, is seriously obstructed by two interlocking bars, which make navigation in stormy days and during low tides very difficult.

Previous to the adoption of the present project the sum of $5,333.50, raised by private subscription, had been expended in dredging at the head of the river and at the bar at the mouth. The average depth in the river was thereby increased to 8 feet and the channel at the mouth was somewhat widened.

The present project for improvement, which was proposed in a report on a survey made in 1891, provides for a channel 150 feet wide and 11 feet deep across the bar at the mouth and for a channel 75 feet wide and 8 feet deep at mean low water inside the river as far as Trappe Landing, situated at the head of navigation. The estimated cost is $7,250.

An appropriation of $2,500 was made for this work by the river and harbor act approved July 13, 1892.

During the fiscal year ending June 30, 1893, the channel across the bar at the mouth of the river was dredged under the first appropriation made, resulting in increasing its width to 100 feet and its depth to 11 feet at mean low water. The channel is of great benefit to the steamers, which generally enter and leave the river during the nighttime.

The amount required to complete the improvement is $4,750. This entire amount could be profitably expended in ensuing fiscal year.

The amount of freight received and shipped in 1892 was 39,094 tons, valued at $897,450. One hundred and six vessels of from 5 to 10 feet draft trade in this river.

WARWICK RIVER, MARYLAND.

This river, formerly named Secretary Creek, is in Dorchester County, Eastern Shore of Maryland, and flows into the Choptank River, one of the largest tributaries of Chesapeake Bay. It is a small tidal basin, 2 miles long, with no fresh water influx at the head, and was originally only 4 feet deep. The average rise of tide is 1.7 feet.

Before the adoption of the present project about $12,000 had been

expended in the improvement of this river, $6,000 by the General Government and the remaining amount by private parties.

The present project for improvement, which was proposed in a report on a survey made in 1891, provides for a channel 100 feet wide and 10 feet deep at mean low water from the 10-foot depth in Choptank River to Secretary Landing at the head of the river, at an estimated cost of $18,600.

An appropriation of $6,000 for this work was made by the river and harbor act approved July 13, 1892.

During the fiscal year ending June 30, 1893, 4,400 feet of the channel, as approved, was completed, beginning in the Choptank River outside the mouth of the river, and part of the turning basin at Secretary Landing was deepened to 10 feet. The obstructions at the entrance, which formerly seriously impeded navigation during low tides and high northwesterly winds, are now removed, but the channel inside the river remains to be improved.

The amount required to complete the improvement is $12,600, $6,000 of which could be profitably expended in ensuing fiscal year.

COMMERCE.

The commercial statistics for 1892 have not been given. Below is an approximate estimate for 1890:

200,000 bushels of grain, valued at	$150,000
200,000 cases of canned fruit, valued at	175,000
300,000 packages of fruit and vegetables, valued at	200,000

The river has an area of rich, productive, and thickly populated country, 10 miles square, depending upon it for shipping facilities. It is a large commercial center, and business and trade of all kinds are growing rapidly. The passenger business from the river is large.

Fish and oysters, as well as stock and miscellaneous products, can not be estimated. The value of general merchandise received is very large. The packing house gives employment to over 100 small vessels during the oyster season. Large vessels come in to bring ice and take away lumber, ship timber, etc. Choptank River Steamboat Company consider this river one of the best shipping points on their line. Their steamers land here daily unless prevented by very low tides or high winds.

PATAPSCO RIVER, MARYLAND.

An examination of Patapsco River, Maryland, from the Craighill Channel to the sugar refinery wharves, Curtis Bay, was required by the river and harbor act of 1890. In the report thereon it is recommended as worthy of improvement, and the following statements appear:

Curtis Bay is the lower end or mouth of a creek or estuary entering the Patapsco River on the west bank about 4 miles below the city of Baltimore. It forms a nearly circular harbor, with a natural depth of from 22 to 26 feet of water, and is admirably situated for industrial enterprises needing deep-water connections in combination with the railroad facilities centering in Baltimore.

At this point are now located the following industries: Baltimore Sugar Refining Company, with a present paid-up capital of $1,000,000, and machinery with a capacity for turning out per day 1,500 barrels of sugar, requiring for this purpose 80,000 tons of raw sugar per annum;

the South Baltimore Car Works, with an annual output of $1,250,000; the South Baltimore Foundry, with annual output of $300,000; the Ryan & McDonald Manufacturing Company (locomotives, machinery, etc.), with an annual output of not less than $500,000.

The Baltimore and Ohio Railroad have in view the erection of large coal piers in this vicinity, where they own extensive water fronts; and it is expected in the near future to establish here an extensive plant for the manufacture of steel rails and plates.

The direct connection from the large pier of the sugar refinery to the ship channels leading to Baltimore intersects what is known as the Fort McHenry division in a distance of about 2¼ miles.

To make, by dredging, a channel from the main ship channel of a width of 150 feet at bottom and of a depth of 25 feet at mean low water would cost $25,000. To give the same width, but a depth of 27 feet at mean low water, which is the depth of main ship channel, would cost $85,000.

It can hardly be doubted that with deep water, a good harbor, and cheap land and rail connections with the whole country, this locality is destined in the near future to be the seat of very large manufacturing operations in addition to the notable ones heretofore named as already in existence.

The river and harbor act of 1892 contained the following item:

Improving Patapsco River, Baltimore Harbor, Maryland: For dredging a channel 150 feet wide at bottom and of a depth of 27 feet, mean low water, from the main ship channel to Curtis Bay, in accordance with recommendation of Col. William P. Craighill, Corps of Engineers, submitted December 13, 1890, $28,000.

The total estimated cost of the improvement was $85,000. The first appropriation of $28,000 has been expended in dredging to a depth of 25 feet at low water. The work, under a contract with the National Dredging Company, was commenced in November, 1892, and after considerable interruption by ice and severe weather, was satisfactorily completed in May, 1893. The channel is made 150 feet wide.

Fifty-seven thousand dollars will be required to complete the channel, all of which amount could be profitably expended in fiscal year ending June 30, 1895.

POTOMAC RIVER AT WASHINGTON, D. C.

Before the improvement was commenced the channel to Georgetown was narrow, crooked, and had not sufficient depth to accommodate commerce. Vessels drawing 16 feet frequently grounded at high water above Long bridge, and to maintain this depth frequent dredging was necessary, and even then the channel was narrow, as the appropriations for dredging were only sufficient to make a narrow cut through the bar. The Washington channel was not only shoal, but narrow, and wholly inadequate to the wants of commerce. By act passed August 2, 1882, Congress adopted a project which had for its object the improvement of the navigation of the river by widening and deepening its channels, the establishment of harbor lines beyond which no obstructions should be built, and at the same time the filling of the flats or marshes on the city front, so that they would not be overflowed by ordinary high tides, the material to be dredged from the channels to be used in filling the flats.

The project provides for such depth of channels as will accommodate the largest class of vessels that can reach Arsenal Point, with such additional depth at the wharves as will enable vessels to receive full

cargoes without grounding at low water; for filling the flats above Long bridge to a height of 3 feet above the flood slope of 1877, and that part of the flats below Long bridge to the same height along the middle line, but sloping on each side of it to 6 feet above mean low tide at the margin; that in order to purify the water of the Washington channel, which will be cut off at the upper end from the Virginia channel, a tidal reservoir or basin be established between the sewer canal and Long bridge, this reservoir to be filled by water from the Virginia channel on the flood tide, and discharged into the Washington channel on the ebb. The plan also contemplated the removal of Long bridge or its rebuilding with longer spans during the progress of the work, and the interception of all sewage now discharged into the Washington channel, and its conveyance to the James Creek, but neither the reconstruction of the bridge nor the building of the intercepting sewer were included in the estimated cost of the improvement.

The estimated cost of the improvement is $2,716,365.

Up to the close of the fiscal year 1892 the expenditures aggregated $1,780,318.33, and the following work had been accomplished: The Virginia channel above Long bridge had been deepened to 20 feet at low tide for a width of from 400 to 550 feet, a part of which has since filled up and been redredged to a width of 250 feet. The bar in the same channel below Long bridge had been dredged to a depth of 20 feet and a width of about 350 feet. This part of the Virginia channel has maintained itself to the full depth originally dredged or has deepened. The Washington channel has been dredged to a depth of 20 feet for a width of 350 feet throughout its entire length and to a depth of 12 feet from the 20-foot channel nearly to the easterly margin of the fill, except a small area near the Seventh street wharf. This channel for the most part maintained itself until the freshet of June, 1889, when considerable filling took place. The junction of the Virginia and Washington channels had been dredged to depths of 20 feet, 15 feet, and 12 feet. The greater part of the tidal reservoir had been dredged to a depth of 8 feet. All the material dredged from the river had been deposited on the flats, and of the 12,000,000 cubic yards estimated to be required about 9,303,600 had been deposited. The entire area of the flats, about 621 acres, had been outlined, and practically the entire area to be reclaimed had been raised above overflow at ordinary high tide.

The riprap foundation for the sea wall had been put in place around the entire river front of the reclaimed area and the margin of the tidal reservoir. The construction of the sea wall for the protection of the margin of the fill from erosion by the waves and the action of the tidal currents had been commenced and about 13,840 linear feet of wall constructed. The construction of a dike on the westerly side of the Virginia channel above Long bridge, with a view to reducing the deposit at that locality, was in progress. The outlet gates at the tidal reservoir at the head of the Washington channel had been completed, with the exception of the railing.

On the Anacostia River two bars in the channel have been dredged, so as to secure 20 feet at low tide from the mouth to the navy-yard. Harbor lines have been established in accordance with the project.

The constructiou of the sea wall was resumed and 4,450 linear feet completed, making a total of 18,290 linear feet.

The channel through the bar (caused by the freshet of 1889) in the Virginia channel above Long bridge has been widened from 200 feet

to 250 feet, the depth being 20 feet. This work has given timely and material relief to the coal trade of Georgetown.

Work on the training dike on the west side of this channel has been continued. Dredging has been commenced in the Washington channel and the embankments for the deposit of the dredged material on Section III have been formed.

On the Anacostia River the Navy Department has dredged a basin 22 feet deep and from 100 to 200 feet wide in continuation of the dredging done under the direction of this Department in 1891–'92.

Reference is made in the report of the officer in local charge to the necessity of rebuilding Long Bridge. In the event of a freshet occurring when the Potomac River is full of ice, great damage is to be expected. The piers of the bridge are of such faulty construction that an ice gorge would be probable, which would cause the water to back up and overflow portions of the city front and through the sewers above the bridge such portions of the lower parts of the city as may be drained by them. Great damage was done by the freshet of June, 1889, but greater damage may occur from a freshet of lesser magnitude if accompanied by an ice gorge.

Amount estimated to complete existing project, $681,365. This entire amount could be profitably expended in fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

[Furnished by Mr. J. W. Averill, Washington, D. C.]

Receipts and shipments.

Calendar year.	Coal.	Ice.	Lumber.	Sand.	Wood.	Miscellaneous.	Total.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1887	264,947	120,237	37,044	50,000	52,419	94,325	618,972
1888	240,836	108,421	45,101	50,000	33,040	104,177	581,575
1889	92,511	115,506	41,407	75,000	35,351	128,905	488,680
1890	72,089	135,552	69,604	75,000	48,457	118,994	519,696
1891	114,913	123,107	50,106	60,000	48,457	154,636	551,219
1892	280,342	148,692	68,178	20,000	48,457	261,285	766,954

Number of vessels of various classes arriving and departing.

Calendar year.	Steamers drawing from 5 to 15 feet, 100 to 400 tons.	Vessels drawing from 10 to 20 feet, 300 to 1,700 tons.	Vessels drawing from 4 to 10 feet, 30 to 300 tons.	Barges drawing from 4 to 10 feet, 100 to 300 tons.
1887	970	573	2,149	993
1888	710	525	1,588	2,821
1889	675	455	1,563	929
1890	696	491	1,572	286
1891	980	445	1,854	862
1892	1,065	466	2,046	527

Ferry and local passenger steamers are not included in the above. No new lines of transportation were established during 1892.

NANSEMOND RIVER, VIRGINIA.

This river is one of the important tributaries of Hampton Roads, Virginia, and is navigable at high water for vessels drawing 11 feet as far as the city of Suffolk, 16 miles from its mouth. Five railroads, two

of which terminate at this place, put this city in communication with the South and West, and two lines of steamers run between it and Norfolk and Baltimore.

Before improvement was undertaken, in 1872, the navigable channel of the Nansemond River was 5 feet deep at low water, and was much obstructed by wrecks and snags.

Between 1873 and 1878 the Government dredged a channel, wherever necessary, 8 feet deep at low water from Suffolk to Hampton Roads, at a cost of $37,000.

The depth was found insufficient to meet the demands of its growing commerce, and in 1887 an examination and survey of the river was made to determine what other improvement was necessary.

The plan of improvement then proposed and since adopted is to secure a channel not less than 100 feet wide at bottom, 12 feet deep at mean low water, from the head of navigation to the mouth of Western Branch, 5.37 miles, including a turning basin, 200 feet square, 300 feet below Suffolk Bridge, by dredging and the construction of spurs and training walls; and a channel of like depth from mouth of Western Branch to deep water at Town Point, 200 feet wide at bottom at its upper end and gradually increasing to at least 400 feet at its lower end, etc., the total estimated cost being, in round numbers, $152,500.

The amount expended on the present project up to June 30, 1893, was $29,968.72, and resulted in securing a channel, 80 feet wide and not less than 12 feet deep at mean low water, through the worst of the shoals between Suffolk and the mouth of the Western Branch.

Amount required to complete the present improvement, $122,500; $50,000 could be profitably expended in ensuing fiscal year.

COMMERCIAL STATISTICS.

The shipments on this river are principally farm products, lumber, etc. Full statistics could not be gotten for the year 1891, although an effort was made to do so. If full shipments of the lumber had been furnished, the tonnage would have shown an increase instead of a decrease for 1891.

Approximate amount of freight of all kinds received and shipped by water.

	Tons.		Tons.
1888	109,900	1890	117,836
1889	217,738	1891	133,723

APPOMATTOX RIVER, VIRGINIA.

This is one of the principal tributaries of the James River, into which it empties at City Point, Va. It is navigable as far as the city of Petersburg, about 11 miles from its mouth.

At the close of the late war the navigation of this river was in such a condition that the depth of water on more than one of the shoals did not exceed 6½ feet at high tide, and this depth was diminished by 3 feet at low tide.

The plan of improvement adopted in 1870 was to attain a depth of 12 feet at high tide, with as much width of channel as the river would bear. This plan has been adhered to. The means depended on have been revetments, jetties, dikes, etc., resorting to the dredge to remove occasional shoals formed by freshets.

As this river is subject to annual freshets which bring down and deposit larger quantities of sand than the current in the navigable portion can carry off, a small annual expenditure for dredging and repair

work will be necessary after the regulating works have all been completed.

The total amount appropriated for this improvement to date is $423,830. The amount expended to June 30, 1892, was $404,587.63.

The dredging of shoals formed by winter and spring freshets was begun at the end of June, 1892. Shoals in Magazine Bend, at the head of Puddledock Cut, in the South Channel, and above Sunken Island, were dredged to a depth of not less than 12 feet at ordinary high water. Thirty-one thousand three hundred and twenty-five cubic yards of material was removed, of which 11,800 cubic yards was redeposited on the banks and 19,425 cubic yards was deposited in making a portion of the dam at the Closure Dike, head of Puddledock Cut. Brush dikes were refilled where they required it, and repairs were made to the Closure Dike. A dam for retaining a part of the freshet flow was built at the Closure Dike. The upper part of this dam was built of the sand dredged from the shoals and the lower 1,243 feet of timber cribs filled with gravel. A freshet early in May, 1893, damaged the unfinished part of this dam. The damages were repaired and the unfinished portion filled with stone.

The amount expended on this improvement during the fiscal year ending June 30, 1893, was applied to the work noted above, to office and operating expenses, etc.

The last river and harbor act appropriated $15,080 to complete the improvement. During the year 1893 a revised estimate of the cost of the improvement was submitted.

The amount now estimated to complete the improvement is $48,090.

For maintenance and repairs during fiscal year ending June 30, 1895, $10,000; amount that can be profitably expended in ensuing fiscal year, $58,090.

The estimate of cost is as follows:

Magazine Bend:	
Extension of training wall, 1,500 feet pile and brush dike, at $4.50	$6,750
Extension of Poor Run Dike, 200 feet pile and brush dike, at $3	600
Petersburg Channel:	
Extension of Hare's Dike, 450 feet pile and brush dike, at $3	1,350
Extension of Joiner's Spring Dike, 2,000 feet pile and brush dike, at $3	6,000
Wing dams 1–17, 1,310 feet sheet-pile dams, at $3.50	4,585
South Channel:	
Training wall, 2,200 feet pile and brush dike, at $3	6,600
Extension of Rushmore's Dike:	
200 feet pile and brush dike, at $3	600
44 wing dams, 935 feet sheet-pile dams, at $3.50	3,225
1,910 feet wattle dams, at $1	1,910
Minor works and repairs	1,000
Sunken Island Channel:	
Training walls, 3,700 feet pile and brush dike, at $3	11,100
Total	43,720
Add for engineering and contingencies, 10 per cent	4,370
Aggregate	48,090
For maintenance and repairs during year ending June 30, 1894	10,000
For maintenance and repairs during year ending June 30, 1895	10,000
Aggregate	68,090

COMMERCIAL STATISTICS.

[Furnished by Mr. W. E. Morrison, port warden.]

Statement of number and tonnage of vessels and value of freight shipped and received at Petersburg, Va.

Year ending—	No.	Tonnage.	Value of freights.		
			Shipped.	Received.	Total.
July 1—					
1881	645	35,967	$74,724	$412,642	$487,366
1882	917	43,961	79,154	519,209	598,363
1883	980	46,070	181,763	569,876	751,639
1884	924	46,050	196,458	612,472	808,930
1885	893	40,669	230,508	529,786	760,294
1886	953	68,835	192,053	474,250	666,303
1887	836	63,169	104,923	304,425	409,348
1888	599	30,079	143,673	372,112	515,785
1889	595	27,981	132,072	270,031	402,103
January 1—					
1890	598	29,229	184,596	323,256	507,852
1891	621	35,219	425,887	280,254	706,141
1892	627	40,034	313,317	330,786	644,103
July 1, 1893	637	42,058	218,270	227,452	445,722

Approximate amount of freight of all kinds received and shipped by water.

	Tons.		Tons.
1888	30,626	1891	26,275
1889	26,121	1892	25,218
1890	21,693		

JAMES RIVER, VIRGINIA.

When the improvement of the James River was regularly undertaken by the Government in 1870 the navigation was obstructed by sunken vessels, by remains of military bridges, and by other obstructions put into the river during the late war to prevent the national fleets from approaching too close to Richmond. There were also other natural obstructions. Rocket Reef and Richmond Bar had only 7 feet of water at mean low tide. From Warwick Bar to Richmond the channel was crooked and obstructed by dangerous rocks and ledges, the Dutch Gap cut-off was not then open, and the river, as regards its availability for commercial purposes, was in poor condition.

The original project of improvement was to secure a depth of 18 feet at full tide (corresponding to about 15 feet at low tide) to Richmond, with a channel width of 180 feet. This project had reached an advanced stage of progress when Congress, by act approved July 5, 1884, adopted the project looking to 22 feet at mean low tide from the sea to Richmond, the width to be 400 feet from the sea to City Point, 300 from thence to Drewry Bluff, and 200 feet from thence to Richmond.

The amount expended to June 30, 1893, was $1,382,875.88, of which sum $589,523.64 has been expended since the new project for 22 feet depth was adopted. At that date the available depth for navigation from the sea to Richmond Bar was 18½ feet at high water, and 16½ feet thence to city limits of Richmond. The amount required to complete the existing project $3,336,070.45, $400,000 of which could be profitably expended in ensuing fiscal year.

COMMERCIAL STATISTICS, 1892.

[Richmond, Va., custom-house report.]

Vessels, steam and sail.

Year ending June 30—	Cleared.	Entered.	Tonnage cleared.	Tonnage entered.	Value of exports.	Value of imports.
1892	421	448	359, 298	381, 141	$138, 756	$10, 180
1893	458	496	392, 185	396, 595	109, 269	21, 096

The vessels varied in draft from 6 to 16 feet.

Totals, points on the river and Richmond.

Shipped:	Tons.
Coal	15, 000
Railroad ties	43, 235
Cordwood	117, 171
Stone	3, 879
Bark	1, 392
Iron	12, 600
Flour	8, 237
Tobacco	12, 329
Grain	4, 010
Hay, shucks, etc	2, 255
Lumber	127, 572
Bricks and tiles	9, 000
Miscellaneous	82, 835
Total	439, 515

Received:	Tons.
Coal	65, 827
Cement, lime, and plaster	11, 625
Salt	2, 273
Iron	6, 733
Fertilizers	29, 206
Iron ore	434
Ice	30, 000
Lumber	950
Miscellaneous	77, 062
Total	224, 110

MATTAPONI RIVER, VIRGINIA.

The Mattaponi River rises near Bowling Green, Va., flows southeast, and empties into York River at West Point, Va. It is navigable by small steamers as far as Ayletts, 52 miles, and can be made navigable for barges 26 miles above—as far as Munday Bridge. The obstructions to 5½-foot navigation are five bars below Ayletts, having ruling depths of from 2.5 to 3.6 feet, and wrecks, snags, logs, and overhanging trees. There were eight bars reported above Ayletts, but no improvement of them is proposed.

The approved project, adopted in 1880, provides for a channel 40 feet wide and 5.5 feet deep through the bars below Ayletts, and the removal of logs, snags, overhanging trees, wrecks, etc., as far up as Munday Bridge.

Up to the close of the fiscal year ending June 30, 1892, $19,167.39 had been expended in removing snags, wrecks, logs, and other obstructions between Robinson Bar and Munday Bridge, a distance of 34 miles, and in building 2,226 linear feet of dike at Robinson Bar, and in the construction of the plant necessary for these operations.

On July 13, 1892, an appropriation of $4,000 was made, as follows: "Improving Mattaponi River, Virginia: Continuing improvement, $4,000, of which $1,500 shall be expended between Ayletts and Guineas, bridges."

The removal of snags and other obstructions was in progress during last fiscal year.

The remaining work under the existing project is as follows: The completion of the dikes at Robinson Bar and the construction of those proposed at Latane Bar, and the dredging of channels at all of the bars below Ayletts having a ruling depth of less than 5.5 feet. Snags and falling trees accumulate each year and will require removal. The estimated amount required for the completion of the existing project is $48,800 but as instrumental surveys have been made of but two bars this estimate will be subject to future revision. Ten thousand dollars of this could be expended in ensuing fiscal year.

COMMERCIAL STATISTICS.

Receipts and shipments.

Class of goods.	Calendar years.			Class of goods.	Calendar years.		
	1890.	1891.*	1892.*		1890.	1891.*	1892.*
	Tons.	*Tons.*	*Tons.*		*Tons.*	*Tons.*	*Tons.*
Farm products	.....	2,400	.....	Ties	6,900	5,640	5,000
Grain	.....	1,000	.....	Wood	7,650	38,700	6,620
Lumber	7,700	1,200	5,500				
Merchandise	10,400	3,120	15,570	Total	32,650	52,060	32,690

*Furnished by Mr. E. T. Lamb, West Point, Va.

Vessels arriving and departing during 1892.

Designation.	No.	Tonnage.	Designation.	No.	Tonnage.
Steam, drawing less than 10 feet	208	10,400	Sail, drawing less than 10 feet	43	8,600
Sail, drawing 10 feet or more	70	27,000	Barges, flatboats, etc	18	1,250

NOMINI CREEK, VIRGINIA.

This stream is an important tributary of the Potomac, which it enters about 82 miles below Washington, D. C.

Before improvement navigation was obstructed by a bar of sand and oyster shells at its mouth, over which but 3 feet could be carried at low tide, and the dangers and difficulties of passing the bar were further increased by a rapid current and cross tides. After passing the bar 8 feet can be carried to Nomini Ferry, about 4 miles above the mouth.

The original project for the improvement, adopted in 1873, provided for dredging a channel 100 feet wide and 9 feet deep through the bar. The project was modified in 1879 by increasing the width to 150 feet, and again in 1885 by increasing the width to 200 feet. In 1890 a further modification was made, proposing the construction of two jetties parallel to the outer channel, retaining the width of dredging at 150 feet. The total cost of this modified project was placed at $72,500. At the close of work in 1883 a channel about 100 feet wide and 9 feet deep had been dredged through the bar. During the suspension of work from 1883 to 1889 the cut was reduced in depth and width by deposits of sand. In 1889 the outer channel was widened and redredged on the westerly side for a width of 94 feet and a length of 1,470 feet, the depths being from 8.9 to 13.8 feet.

During the fiscal year ending June 30, 1891, the channel at and outside of White Point was dredged, the width attained being from 130 to 150 feet, and the depth 9 feet. A riprap dike was built inside White Point to check the cross tidal current. Up to June 39, 1892, $42,211.76 had been expended.

During the fiscal year ending June 30, 1893, $1,665.35 has been expended. Two hundred linear feet of the east jetty outside White Point has been finished during the year.

The work remaining to be done under the project is the completion of the jetties and the continuation of the dredging to 150 feet width through the remainder of the bar. The total amount needed to complete the work is $20,000, and this can be profitably expended in one year.

COMMERCIAL STATISTICS.

Tonnage for calendar year—	Tons.
1889	13,542
1890	15,825
1891	62,300
1892	*21,000

PAMUNKEY RIVER, VIRGINIA.

This river is navigable from its mouth at West Point, on the York River, to Hanovertown or Dabney Ferry, a distance of about 59 miles. Seven feet can be carried to Piping Tree Ferry, a distance of 43 miles. Navigation was originally obstructed by five bars in the upper part of the river, and by snags, logs, and overhanging trees.

The product was adopted in 1880 and amended in 1885, and provides for channels 100 feet wide and 7 feet deep through Spring Bar and Skidmore Bar, or to a distance of 47 miles above West Point, and channels 40 feet wide and from 3 to 5 feet deep through the bars above, together with the removal of logs, snags, wrecks, and overhanging trees.

The amount expended to June 30, 1892, was $18,446.66. Snags, logs, and overhanging trees had then several times been removed from 22.5 miles of the river between Garlick Ferry and Hanovertown; dikes had been built at Spring Bar and Skidmore Bar, and a channel 95 feet wide and from 6 to 7 feet deep had been dredged through Skidmore Bar. The plant necessary for snagging operations, pile-driving, etc., had been constructed, being paid for in part from appropriations for this river. No work has been done during the fiscal year ending June 30, 1893, the plant being engaged on the Rappahannock River and the Mattaponi River, and not available for the Pamunkey.

The work to be done is the dredging of the channel at Spring Bar and at the three unimproved bars above, and the removal of obstructions. To complete the improvement will require $7,000, all of this could be expended in ensuing fiscal year.

RAPPAHANNOCK RIVER, VIRGINIA.

The Rappahannock River is navigable from its mouth in Chesapeake Bay to Fredericksburg, Va., a distance of 106 miles. The lower part of the river has the character of a tidal estuary, the width varying from 1 to 3½ miles. The ruling depth at the mouth is 5 fathoms, and this depth holds to Jones Point, 28 miles above, while 17 feet can be carried to within 1 mile of Tappahannock, which is 41 miles from the mouth. Above Tappahannock the river has a tortuous course, and above Port Royal, 29 miles from Fredericksburg, it flows between high banks. The width at Fredericksburg is about 350 feet, gradually increasing to about 1,500 feet at Port Royal. In 1871, prior to the inception of the improvement, 6 feet could be carried within a mile of Fredericksburg, and then 4 feet to the town. The river drains a large area of agricultural country.

The obstructions to navigation of the Rappahannock River, before improvement, were nine bars between Tappahannock and Fredericksburg, over which the ruling depths were from 4 to 10.5 feet. The chief

* No new lines of transportation were established in 1892. It is reported that the improvement has done very much toward lowering freight rates.

obstructions were in the 12.5 miles of river below Fredericksburg, where seven of the bars are found. Of these bars, Fredericksburg Bar, with a least depth of 4 feet, and Spottswood Bar, 4 miles below Fredericksburg, with a least depth of 6 feet, caused the most delay to steamboats and vessels.

The original project, adopted in 1871, proposes a channel 10 feet deep and 100 feet wide through all the bars. This was modified in 1879 by increasing the dimensions of the channel between Port Royal and Tappahannock to 15 feet in depth and 200 feet in width, to accommodate the larger class of vessels.

Up to June 30, 1892, $90,500 had been expended on the original project and $123,066.38 on the modified project, making a total, including outstanding liabilities, of $213,566.38, and depths of from 8.4 to 9.5 feet secured through the bars between Fredericksburg and Port Royal by dredging and the construction of dikes. Wrecks and snags obstructing navigation had also been removed. During the fiscal year ending June 30, 1893, $8,200.86 has been expended. Fourteen snags have been removed between Fredericksburg and Port Royal and 711.6 linear feet of dike built at Fredericksburg Bar. The redredging of a channel 100 feet wide and 10 feet deep at Fredericksburg Bar is in progress.

The work remaining to be done under the project is the improvement of the two bars between Port Royal and Fredericksburg, and the dredging and dike construction necessary to secure and maintain a channel 10 feet deep and 100 feet wide through the seven bars between Fredericksburg and Port Royal. As each freshet brings new deposits of sand and silt into the river, particularly at Fredericksburg Bar, the head of tide water, an annual appropriation of about $7,500 will be required for its maintenance.

Amount required for completion of existing project is $144,000. Twenty-five thousand of this could be profitably expended in fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

Tonnage for—	Tons.
1888	83,600
1890	83,830
1892	*126,333

No new lines of transportation were established during the year 1892.

The effect of the improvement thus far, by increasing the facilities for navigation, is shown in the lower freight rates prevailing where they are in competition with railroad transportation, and otherwise.

URBANA CREEK, VIRGINIA.

Urbana Creek is a tributary of the Rappahannock River, which it enters 16 miles above the mouth. Navigation was obstructed in 1874 by a bar outside the mouth, over which but 6.5 feet could be carried. In 1882, after the improvement had been commenced, a shoal within the creek, having a least depth of 7 feet, and near the town of Urbana, was regarded as an obstruction to steamboat navigation.

The approved project, adopted in 1879, was the excavation of a channel 150 feet wide and 10 feet deep through the outer bar, at an estimated cost of $20,000. The project was modified in 1883 so as to include dredging a channel through the shoal within the creek, and in 1888 so as to include a system of dikes or jetties along the sand spit at the

mouth to prevent the natural channel from closing. The revised estimate for the entire project was $34,580.

Up to the close of the fiscal year ending June 30, 1892, $20,534.04 had been expended. The channel through the outer bar had been dredged to a depth of 10 feet and a width of 140 feet, but owing to the action of storms the width had decreased from sand filling to 110 feet and shoaled to depths of from 8½ to 9½ feet.

A channel had also been dredged through the shoal within the creek from 80 to 170 feet wide and 10 feet deep, and dikes and jetties had been built along the sand spit to check the movement of sand, which tends to close the natural channel at the end of the spit. This channel was widened 70 feet by dredging off the end of the sand spit. The depth made was 10 feet at low tide.

An appropriation of $3,000 was made July 13, 1892, which will be applied to widening and deepening the channel through the outer bar. This work was in progress at the close of the fiscal year ending June 30, 1893, and at that date the channel was 10 feet deep and 120 feet wide.

The amount required to complete the existing project, $10,080; all of which should be expended in fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

Tonnage for calendar year—	Tons.
1890	5,350
1891, reported by Mr. F. A. Bristow as	19,500
reported by Mr. J. D. Cressit as	22,100
1892	20,095

Arrivals and departures of vessels, 1892.

	No.	Tonnage.
Steamers, drawing less than 10 feet	8	1,200
Sailing vessels drawing less than 10 feet	200	8,000
Barges, flatboats, etc	5	1,500

YORK RIVER, VIRGINIA.

The York River is formed by the union of the Mattaponi and Pamunkey rivers at West Point, Va., is 41 miles in length, and empties into Chesapeake Bay about 16 miles above Old Point. Entering the river, 24 feet can be carried for 32 miles up to Potopotank Bar, 9 miles below West Point. In 1880 the ruling depth on this bar was 18.5 feet. The next obstruction to navigation is West Point Bar, which commences about 2 miles below West Point and extends up to West Point. West Point is the shipping point of the Richmond and West Point Terminal Railroad system. The wharves from which shipments are made are built within the mouth of the Pamunkey River, and further obstruction to navigation was found in shoal water in front of these wharves.

The original project provided for a channel 22 feet deep and 200 feet wide through these bars, with an increased width at the wharves. In 1884 the proposed channel width was increased to 400 feet, and in 1887 the project was amended so as to include the construction of a dike along the flats on the right of the channel to contract the waterway and maintain the depth dredged, which had decreased from continued silting.

Up to the close of the fiscal year ending June 30, 1892, $145,924.18 had been expended in the following work: A channel 105 feet wide and 22 feet deep was dredged in 1880–'81 through Potopotank Bar, which had, however, shoaled in 1890 to from 20.8 to 21.7 feet. A channel 22 feet deep and from 161 to 257 feet wide, with a center cut 24 feet deep and 40 feet wide, had been dredged at West Point Bar below the wharves, but this channel has shoaled to such an extent that much redredging has been necessary. The channel in front of the West Point wharves has been dredged to a width of 160 feet and a depth of 22 feet, the length being 2,700 feet.

During the fiscal year ending June 30, 1893, the construction of the dike at West Point Bar was commenced, and at the close of the year was still in progress.

Great difficulty has been experienced in finding suitable dumping grounds on the York River. The flats on either side of the channel are largely occupied by oyster beds, whose owners object to the dumping of material or the construction of dikes.

Future appropriations will be applied to the completion of the channels at West Point and Potopotank bars, and of the dike at West Point Bar, in order to maintain the channel secured by dredging.

On the basis of the original estimate the amount required for the completion of the project is $115,050, but owing to the continued shoaling of the channel this amount will probably be insufficient. One hundred thousand dollars could be expend in fiscal year ending June 30, 1895.

The trade of the York River is large, increasing, and important, and the improvement is worthy of liberal appropriations by Congress.

Vessels arriving and departing.

	1891.	1892.
	No.	*No.*
Steamers drawing 10 feet or more	727	724
Steamers drawing less than 10 feet	104	208
Vessels drawing 10 feet or more	178	96
Vessels drawing less than 10 feet	824	190
Barges, flatboats, etc	191	18

Statement of tonnage by years.

Reported for—	Tons.	Reported for—	Tons.
1888	285,480	1891	304,338
1889	328,353	1892	345,559
1890	418,190		

No new lines of transportation were established in 1892; but it is reported that the established lines have increased their service, giving much better satisfaction, and that the work done has benefited shipping to a great extent.

AQUIA CREEK, VIRGINIA.

This stream lies wholly in Stafford County, Va., and is a tributary of the Potomac River, into which it empties about 41 miles below Washington. The head of navigation is at Whartons Landing, about 7¼ miles from the mouth of the creek. The channel near this point is about 7 miles long, and in 1872 its navigation was chiefly obstructed by shoals between the mouth and the "Narrows," 4.5 miles above. Here the creek takes the character of a wide bay, from 1,000 to 6,000 feet wide,

while the depths of water ranged from 2 to 4 feet over an almost continuous shoal of soft mud. Above the "Narrows" the creek is from 60 to 200 feet wide, with a depth of from 2 to 17 feet, the shoaler portions being near the head of navigation. The stream is crossed by a bridge of the Richmond, Fredericksburg and Potomac Railroad about 3 miles above the mouth, the draw of the bridge being but 28 feet wide.

From 1872 to 1878 appropriations amounting to $10,000 were made by Congress, and the navigation was improved by dredging a channel from 40 to 50 feet wide and from 4 to 5 feet deep through the shoaler parts of the creek, chiefly above the railroad bridge.

A new survey of the creek was provided for in the river and harbor act of 1888 and was made in 1889. The channel dredged was found to have maintained its dimensions between the railroad bridge and the "Narrows," but at other places it had filled in. The general depth of water in the creek remained substantially as in 1872. Estimates for improving the navigation were submitted January 18, 1890, and an appropriation of $10,000 was made by the river and harbor act of September 19, 1890.

The project for the improvement, approved December 4, 1890, proposes a channel 80 feet wide and 6 feet deep, dredged through the shoals where less than 6 feet is found between the mouth of the creek and the "Narrows." The proposed work above the Narrows was omitted.

Up to June 30, 1892, $9,504.05 had been expended. A channel 80 feet wide and 6 feet deep had then been dredged from Thorny Point, at the lower end of the shoal, up to the railroad bridge, a distance of 12,280 feet.

The work remaining to be done under this contract is the completion of the channel above the railroad bridge. Recent and more detailed surveys show the amounts of dredging to be less than originally estimated, while lower prices have been obtained on the several contracts than were assumed in the project. It is now estimated that the present project can be completed for $10,000.

COMMERCIAL STATISTICS.

[Furnished by Mr. R. L. Flatford, Garrisonville, Va.]

Tonnage for calendar year 1892 23,800

A steamboat line from Washington, giving triweekly service, was established during the year.

OCCOQUAN CREEK, VIRGINIA.

Occoquan Creek is a tributary of the Potomac River, which it enters about 25 miles below Washington, D. C. The stream is navigable from its mouth, at Sandy Point, to the town of Occoquan, a distance of 4 miles.

The principal obstructions to navigation were four bars, which were improved between 1873 and 1880 by dredging and dike construction, so as to secure a navigable depth of about 6 feet at low tide. Four appropriations were made, amounting to $25,000, and in 1880 the improvement was regarded as completed.

In compliance with the provisions of the river and harbor act of August 11, 1888, a new survey was made in 1889, and on three of the bars the dredged channels were found to have filled in so that the ruling depths were 3 feet, 4.2 feet, and 4 feet, respectively.

The project for the new improvement comprises the dredging of channels 6 feet deep and from 100 to 150 feet wide through the bars, with the construction of such dikes as may be required to maintain the depth

secured by dredging. The first appropriation for the new work was made September 19, 1890. At the close of the fiscal year ending June 30, 1892, $9,801.99 had been expended. At that date a channel 6 feet deep and from 100 to 150 feet wide had been dredged through the Lower Mud and a channel 8 feet deep and from 70 to 100 feet wide had been dredged through Occoquan Bar.

At the last-named bar the depth was made 8 feet to anticipate probable shoaling from freshets. The depth of the sand bar had been genrally increased by the sand dredges working there, while the channel at the Upper Mud remained substantially as reported from the survey of 1889.

The amount expended during the fiscal year ending June 30, 1893, has resulted in the completion of the channel through Occoquan Bar to the depth of 8 feet and the full width of 100 feet; in such dredging as was needed to complete a channel 6 feet deep and 100 feet wide through the sand bar; and in widening a considerable part of the channel at the Upper Mud to a width of 100 feet, the depth being 6 feet.

In addition to the dredging above mentioned, the greater part of a riprap dike has been built at Occoquan Bar. The contractor for this work was interrupted by an injunction from a State court or the work would have been completed.

The work remaining to be done is the completion of the channel at the Upper Mud and the completion and construction of the dikes at Occoquan Bar, the Sand Bar, and the Upper Mud. The estimated cost of the remaining work, based on the original estimate, is $30,000; all of this amount could be profitably expended in fiscal year ending June 30, 1895.

COMMERCE.

The total tonnage of the river is 56,705 tons.

LOWER MACHODOC CREEK, VIRGINIA.

Lower Machodoc Creek is a tributary of the Potomac River, which it enters on the right about 85 miles below Washington, D. C. It has a navigable length of about 4 miles, and the lower part of the stream affords a good harbor for vessels drawing 12 feet or less. In 1892 navigation was obstructed by a bar at the "Narrows," 2 miles above the mouth, over which but 4 feet could be carried at low tide. After passing the bar, depths of from 10 to 14 feet are found, gradually diminishing, however, to about 6 feet at Drum Bay, the head of navigation.

The project for the improvement, based on survey of 1892, made subsequent to the appropriation of July 13, provides for dredging a channel 9 feet deep and 150 feet wide through the bar at the "Narrows," at an estimated cost of $15,000.

The appropriation of $3,000, made July 12, 1892, was not sufficient for dredging other than a narrow channel through the bar, about 30 feet wide and 9 feet deep. Such a channel would be of little benefit to navigation, and would probably shoal before another appropriation is made. In order, however, to afford the relief asked by citizens of this locality, the project provided for the application of the available funds to a channel 6 feet deep and 100 in width for temporary use until Congress should make further appropriations. Dredging at Narrows Bar was in progress at the close of the last fiscal year.

Twelve thousand dollars will be required to secure a channel 150 feet wide and 9 feet deep through the bars; all of this could be profitably expended in ensuing fiscal year.

COMMERCE.

	Tons.		Tons.
Grain	435	Cord wood	500
Oysters	375	Fruit and vegetables	200

ELK RIVER, WEST VIRGINIA.

This river is one of the chief tributaries of the Great Kanawha. Its course is tortuous, as is shown by the fact that the distance from its mouth to Braxton is 55 miles in a straight line, but 100 miles by the windings of the stream. The average low-water width is about 200 feet, with narrows at the rapids of about 150 feet in width, and occasional portions of about 300 feet in width. The pools vary in depth from 3 to 10 feet, and are separated by rapid shoals of cobblestones and gravel, on which there has been, at low seasons, a depth of but a few inches of water. Freshets of small height are of frequent occurrence, but rapidly pass off. The annual rise in the spring is about 10 or 12 feet.

The approved project of improvement has been the removal of rocks, snags, overhanging trees, etc., and the cutting of narrow sluices through the rapids and shoals. The principal interests to be served are those of lumbering and rafting, but much country produce is also carried downstream in small boats, which return with merchandise, etc.

The total amount appropriated for this work is $26,500.

The work done was between Little Otter, 6 miles below Sutton, and Mink Shoals, 4 miles from the mouth of the river, embracing a distance of about 90 miles. It consisted mainly in clearing and widening the chutes and in building, altering, and repairing chute walls on the shoals. A passage for rafts was also made through four old and abandoned milldams, a break in the Blue Creek Dam was repaired, and, where required, snags, leaning trees, and like obstructions were removed. The work was done between August 10 and October 27, 1892, with a force of hired laborers under the overseer employed on this part of the river last year.

A serious obstruction to the navigation of this river at some stages consists of several other milldams. The attention of the proper authorities has been called to these in compliance with the law.

Three thousand dollars could be profitably expended in fiscal year ending June 30, 1895.

COMMERCE.

The total amount of timber, merchandise, and produce carried on the river in 1893 was 131,400 tons.

GUYANDOTTE RIVER, WEST VIRGINIA.

The Guyandotte River rises in the southwestern part of West Virginia, and, after flowing through the State in a generally northwestern direction for some 150 miles, empties into the Ohio River at Huntington.

This stream was originally much obstructed by snags, logs, leaning trees, the remains of old dams, and milldams owned by private parties, which required removal.

The project for the improvement was adopted in 1878, and provided for the removal of existing obstructions, natural and artificial, so as to form a channel 30 feet wide, with a least depth of 18 inches, during five months of the year, and extending up the river a distance of 122 miles.

Up to the close of the fiscal year ending June 30, 1892, $16,406.30 had been expended, resulting in the partial improvement of the river for a distance of 119 miles, removing snags, logs, etc., from the channel, and cutting passageways through old dams.

During the fiscal year ending June 30, 1893, $2,039.34 was expended, and resulted in the general improvement of the stream for rafting purposes and low-water steamboat navigation.

The stream is incapable of permanent improvement, as the obstructions are liable to reform.

Two thousand dollars could be profitably expended in ensuing fiscal year.

COMMERCE.

The total commerce of the river for 1893 was 182,250 tons, an increase of 79,450 tons over that of 1892.

GAULEY RIVER, WEST VIRGINIA.

The Gauley River rises in Webster County, W. Va., and, after flowing in a southwesterly direction for about 120 miles, it empties into the Kanawha at Gauley Bridge.

The mountains on either side of the Gauley River are filled with beds of excellent coal, and iron ore of good quality is said also to be abundant. The upper parts of the river, as well as all its tributaries, are heavily timbered with walnut, oak, and poplar, in which a heavy trade is even now carried on.

The "Roughs" of the Gauley, commencing 12 miles from the mouth and extending for a distance of 26 miles, may be deemed an insuperable barrier to open navigation by boats for the Gauley at and above them, and for its tributaries above them, including Meadow River, except at a very great cost, out of proportion to any advantage likely to be gained by such an improvement in the present condition of the country.

The Gauley, as high up as the foot of the "Roughs," is already navigable for bateaux carrying 8 to 10 tons, but the navigation is difficult. It is, however, important to the people living along and near this stretch, for by it they are enabled to communicate with the pool of the Great Kanawha River, just below the mouth of the Gauley, along which runs the trunk line called the Newport News and Mississippi Valley Railroad.

Operations for the improvement of this river were instituted by an examination made in 1887 in accordance with the provisions of the river and harbor act of 1886. It was then pointed out that a valuable improvement of the 12 miles of river from the mouth to the "Roughs" could be made at an expense of $10,000, and that a great advantage would follow the expenditure of $65,000 in the 26-mile reach called the "Roughs," in facilitating and cheapening the bringing to market of millions of feet of lumber of the most valuable of varied kinds.

The approved project has consisted in the removal of ledges and loose rocks and the making of channels through shoals of loose rock and bowlders from the mouth of the river to the "Roughs" to improve the navigation for boats and rafts, and in blastine down the very large bowlders in the "Roughs" to permit the more free passage of logs. The amount expended to the close of the fiscal year ending June 30, 1892, was $5,737.32, with decided advantage to the navigation over the worst shoals below the "Roughs."

The amount expended in the fiscal year ending June 30, 1893, has been $2,964.80.

The work was commenced in July, 1892, and was closed in October. The portion of the river included in the operations was from the mouth to the "Roughs." Its navigable condition has been thereby decidedly improved to obtain a depth of 2 feet at ordinary low water.

Amount estimated to complete existing project, $66,000. Five thousand of this could be profitably expended in ensuing fiscal year.

Commercial statistics for Gauley River, West Virginia.

Year ending June 30—	Saw logs.	Lumber.	Staves.	Shingles.	Tonnage of timber.	Produce, etc.	Total from Gauley.	Merchandise to Gauley.
	Feet.	*Feet.*				*Tons.*	*Tons.*	*Tons.*
1888	691,800	2,535,300	177,400	.....	7,121	36	7,151	750
1889	890,400	3,615,000	274,200	.....	9,491	78	9,569	1,322
1890	384,800	4,452,500	.....	.....	9,676	90	9,766	1,985
1891	384,700	4,701,300	100,000	.....	10,347	89	10,436	1,964
1892	261,170	5,249,200	1,200,000	111,000	9,527	103	9,630	3,083
1893	302,000	5,470,000	113,700	75,000	9,457	114	9,571	2,405

INLAND WATERWAY BETWEEN BEAUFORT AND NEW RIVER, NORTH CAROLINA.

This waterway is 50 miles long and lies from Beaufort for 28 miles in Bogue Sound nearly to Swansboro; from the westerly end of Bogue Sound, 22 miles to New River, it follows intricate tidal sloughs varying from 1,000 feet to 12 feet in width, from 10 feet to 6 inches in depth at high water, and winding through a marine marsh, filling the area between the outlying barrier beach and the mainland.

Swansboro is opposite Bogue Inlet and at the mouth of White Oak River. Five and one-half feet can usually be carried over the changeable bar at the inlet, and boats of 3 feet draft can ascend from this waterway up White Oak River about 24 miles, or 16 miles in an air line.

The project embraces only the 28 miles from Beaufort to Swansboro, and was approved in 1885 to dredge a channel 100 feet wide and 3 feet deep at low water through the shoals between those points, at a cost estimated in 1887 at $50,000.

Under this project $40,000 have been appropriated and $30,299.83 expended to June 30, 1893, at which date a channel not less than 3 feet deep at low water had been obtained by dredging through six shoals, aggregating in length about 4 miles, but at three localities, aggregating about 1,900 feet between shoals, which had been dredged, a draft of only 2½ feet could be carried.

Ten thousand dollars appropriated by the last river and harbor act has not been expended, as the channel through the shoals was at that date thought to be sufficient; but from a survey made in 1893 it was found that the depth was not sufficient for the traffic.

A year ago 6,000,000 feet of lumber were shipped annually from White Oak River, of which 5,000,000 feet then went out through Bogue Inlet and about 1,000,000 feet through Bogue Sound. Owing to the changeable character of the bar at that inlet and to the establishment of mills near Morehead City, where it is dressed, the entire 6,000,000 feet of lumber annually are now to be shipped through Bogue Sound. It is transported in barges 86 by 20 feet and carrying about 40,000 feet

each, towed by a tug of 20 feet beam, drawing 4 feet of water when loaded with 20,000 feet of lumber.

Ten thousand dollars will be required to complete the improvement, and this amount could be profitably expended in ensuring fiscal year.

COMMERCE.

Freight transported.

Calendar year ending December 31—	Tons.
1886	12,250
1890	29,332
1891	30,240

Showing an increase of 18,990 tons over 1886, when the improvement was commenced.

LOCKWOODS FOLLY RIVER, NORTH CAROLINA.

This river, emptying directly into the Atlantic Ocean south of Cape Fear, has a length of 50 miles and a drainage area of 180 square miles.

When the United States began this improvement in 1892 the depth on the changeable ocean bar was usually 4 feet at low and 8 feet at high water. These depths could be carried at low stages 1½ miles up the channel to a mud flat, over which for 1½ miles the channel depth averaged less than 1 foot at low water. A little above these flats there was a shoal 300 feet long upon which the depth at low water was about 2½ feet, thence about 22 miles by river to Lockwoods Folly Bridge the depth was nowhere less than 5 feet.

The project was adopted in 1887 to dredge a channel through the flats 100 feet wide and 7 feet deep at low water.

To June 30, 1892, $4,964.32 had been expended.

At that date one cut 40 feet wide and 5 feet deep at low water had been dredged the length of 2,530 feet, about one-third of the distance through the shoal.

The amount, $3,000, appropriated July 13, 1892, being too small to form a contract for dredging at an advantageous rate, the Secretary of War, August 4, 1892, authorized it to be withheld from expenditure for the present, and no work has been done during the fiscal year ending June 30, 1893.

Amount estimated to complete existing project, $32,000, and the amount of $22,000 could be profitably expended in ensuing fiscal year.

COMMERCIAL STATISTICS.

The commerce for the year ending December 31, 1892, is estimated as follows:

Class of goods.	Tons.	Class of goods.	Tons.
Cotton	10½	Turpentine, crude and spirits of, and rosin	364
Tobacco	2	Lumber and its products	1,000
Rice	18	Fertilizers	25
Grains	68	Machinery	10
Vegetables, including truck	63	General merchandise	289
Live stock, including poultry	3		
Meats and their products	22		
Fish and shellfish	270	Total	2,361½
Tar	217		

NORTHEAST (CAPE FEAR) RIVER, NORTH CAROLINA.

A survey of this stream was made in 1889, and the act of 1890 appropriated $5,000 to begin its improvement.

The Northeast (Cape Fear) River rises in the extreme northern part of Duplin County, flows in a general southerly direction and empties into the main Cape Fear River at Wilmington, some 30 miles from the ocean. It has a total length of about 130 miles and about 1,600 square miles of drainage area. Over its lower 50 miles it is tidal.

When the United States began to improve it in 1890 a draft of at least 6 feet could be carried up 48 miles to Bannermans Bridge at lowest stage. From Bannermans Bridge 55 miles up to Kornegays Bridge the river was so shallow its navigation even by flatboats was not usually practicable for any periods of considerable duration, but was dependent upon freshet stages and therefore intermittent at all seasons of the year. Above Bannermans Bridge it was badly obstructed by snags and overhanging trees.

The project of 1889 is to clear the channel to its natural depth and to a good width for small light-draft steamers up to Hallsville and for pole boats up to Kornegays Bridge, at an estimated cost of $30,000.

Ten thousand dollars has been appropriated for this work.

To June 30, 1892, $3,843.71 had been expended.

At that date the channel to its natural depth and to a width of 40 feet had been cleared merely of its worst obstructions to a high-water navigation from Bannermans Bridge up 31½ miles to Chinquepin.

With the amount applied during the fiscal year ending June 30, 1893, the channel and banks of the lower 4¾ miles of the most obstructed part of the river have been cleared from Rafting Oar to the vicinity of Coxs Bluffs.

Flatboats of 30 to 50 tons capacity ascend the river to Kornegays Bridge, about 103 miles above Wilmington, carrying up merchandise and fertilizers and bringing down naval stores and some agricultural products. Many logs in rafts and considerable quantities of lumber and lumber products are also brought down. Tugboats of 8 tons capacity, drawing 3 feet, now tow these flatboats up the river to Bannermans Bridge at all times, and to Big Pitch Kettle, 54 miles above the mouth, where there is a rocky bar, at ordinary high lunar tides during low river stages.

The amount (estimated) required for completing the work, $20,000, $10,000 of which could be profitably expended in fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

The commerce for the year ending December 31, 1892, is estimated as follows:

Class of goods.	Tons.	Class of goods.	Tons.
Cotton	35	Tar	733
Cotton seed, meal, and oil	100	Turpentine, crude and spirits of, and rosin	2,389
Tobacco	5	Lumber and its products	29,651
Rice	81	Fertilizers	100
Grains	255	General merchandise	553
Vegetables, including truck	132	Coal and minerals	3,220
Live stock, including poultry	12		
Meats and their products	138		
Fish and shellfish	25	Total	37,429

Gain over last year, 7,134 tons.

PASQUOTANK RIVER, NORTH CAROLINA.

Pasquotank River has a total length of about 51 miles and a drainage area of about 200 square miles, emptying into Albemarle Sound. It forms a part of an important canal and river route from Norfolk to Albemarle and Pamlico sounds.

When placed under governmental improvement in 1890, this stream possessed a fairly cleared 9-foot navigation upward 31 miles to the lower mouth of Turners Cut; thence a poorly cleared 5-foot navigation upward 5 miles to the upper end of Turners Cut; thence a badly obstructed 3 to 4 foot navigation for flats and narrow barges upward 6 miles to Lebanon Bridge.

The original project of 1889 was first to clear the 5 miles of channel in the river and Moccasin Track from the lower end of Turners Cut to the original terminus of the canal to permit boats passing through the canal to avoid Turners Cut, which had shoaled; and, second, to clear out the river 6 miles farther to Lebanon Bridge for navigation by pole or flat boats, at an estimated cost of $9,000.

The sum of $2,416.15 had been expended to June 30, 1892.

At that date there was a channel in the river and Moccasin Track from the lower end of Turners Cut up to the original terminus of the canal practicable for, but not used at all by, the boats traversing the canal, the Moccasin Track and a channel 60 feet wide in the river for the 2½ miles next below being thoroughly cleared, and fairly cleared the other 2½ miles down to the lower end of Turners Cut. Below Turners Cut the boats which navigate the canal met with some obstructions in the channel.

By the application of the amount expended during the fiscal year ending June 30, 1893, those obstructions have been removed and there is now, for boats of the draft that can navigate the canal, an unobstructed channel in the river up to the entrance to the canal at the lower mouth of Turners Cut.

It is estimated that $1,000 will be required to maintain the improvement, and this amount can be profitably expended in ensuing fiscal year.

The engineer in charge of the work has the following to say:

The route by the Pasquotank River and Dismal Swamp Canal, if deepened to 9 feet, would so greatly benefit eastern North Carolina, forming, moreover, a part of the interior coast-wise water route, it is believed to be worthy of any means which the General Government may deem it expedient to apply to its improvement.

Eastern North Carolina contains very extensive pine forests interspersed with swamps abounding with cypress. For the lumber from these forests, and especially for the short-leaf pine, embracing fully 90 per cent of the pine lumber in the region of the sounds, there is a great and increasing demand in Northern markets in consequence of the depletion and high price of Northern white pine. Of about 80,000,000 feet of lumber cut annually in the region of the sounds about 20,000,000 feet go north by rail and about 60,000,000 feet by the Albemarle and Chesapeake Canal route and by Ocracoke Inlet. These two latter routes are the only available outlets by water from Pamlico and Albemarle sounds, and their inadequate depth much hampers the transit of lumber north from the forests bordering the sounds. A draft of not more than 7 feet can ordinarily be carried through the Albemarle and Chesapeake Canal route, and northerly winds reduce it to less than 6 feet, while not more than 7 feet can be carried over the shoals immediately within Ocracoke Inlet.

CAPE FEAR RIVER, NORTH CAROLINA, ABOVE WILMINGTON.

The present head of navigation of this river is Fayetteville, 112 miles above Wilmington. Before improvement was begun in 1881 this part of the river was navigable during nine months of the year; but the channel for the upper 75 miles was badly obstructed by sunken logs, snags, overhanging trees, and shoals, and for the upper 66 miles it was full of shoals, on which there was not more than 12 to 14 inches of water during the low-water season. At that time the navigation was owned by private parties.

The project of 1881, as matured in 1885 and 1886, is to obtain at all times of the year a depth of 4 feet from Wilmington, 73 miles to Elizabethtown, and of 3 feet thence 42 miles to Fayetteville, by removing snags and rock from the bed and overhanging trees from the banks, by contracting the channel by jetties on the shoals, and by a little dredging at a bar of clay, at a total cost, estimated in 1893, of $275,000.

To June 30, 1892, $99,230.31 had been expended upon this work.

At that date navigation from Wilmington to Fayetteville was not materially interfered with by snags, except at two short places and at occasional points where caving of banks had carried trees into the river. Up to Elizabethtown the least channel depth on the shoals at ordinary low water was (from surveys made in 1893) about 2.6 feet and from Elizabethtown up to Fayetteville about 0.8 of a foot.

With the amount applied during the fiscal year ending June 30, 1893, 13 miles of channel have been recleared of snags, 3,619 linear feet of jetties of brush and stone have been built, which have resulted in completely improving three of the worst shoals on the river at and above Elizabethtown, having a total channel length of 2.4 miles, and all the shoals on the river have been surveyed.

The amount estimated to complete the existing project is $156,750, and $40,000 could be profitably expended in fiscal year ending June 30, 1895.

COMMERCE.

The commerce for the year ending December 31, 1892, is estimated as follows:

Class of goods.	Tons.	Class of goods.	Tons.
Cotton	757	Tar	2,149
Cotton seed, meal, and oil	140	Turpentine, crude and spirits of, and rosin	6,701
Tobacco	28	Lumber and its products	49,102
Rice	347	Fertilizers	8,000
Grains	805	General merchandise	3,898
Vegetables, including truck	250		
Livestock, including poultry	74		
Meats and their products	519	Total	72,810
Fish and shellfish	40		

The river is very useful in regulating freight rates by rail; for instance, in January, 1893, the freight rate per ton of 2,000 pounds on fertilizers in carloads of not less than 10,000 pounds was $2.10 from Wilmington by railroad, 43 miles, to Goldsboro, with no competing line, and $1.60 from Wilmington, 44 miles, to Fayetteville by the Cape Fear and Yadkin Valley Railroad in competition with the river. In May, 1893, the freight on cotton from Fayetteville to Wilmington was 60 cents per bale, and from Goldsboro to Wilmington 22¼ cents per 100 pounds, or at the average weight of a bale (500 pounds), $1.11¼ per bale.

CAPE FEAR RIVER, AT AND BELOW WILMINGTON, N. C.

The Cape Fear River, emptying into the Atlantic Ocean at Cape Fear, has, from its mouth up to its head waters in the mountains, a total length of about 426 miles. The two main branches of this river meet at Wilmington. Below Wilmington the river is a tidal basis, about 26 miles in length, the ocean bar being 2 miles seaward of the river mouth.

When placed under improvement, in 1829, this stream had three bar entrances, with least depths as follows: About 9 feet at the Baldhead Channel, 9 feet at the Rip Channel, and 10 feet at New Inlet Channel, these bars being respectively 9, 6, and 2 miles below the point which was then the head of the river's delta. From the head of this delta, 20 miles up to Wilmington, there were several shoals with a least depth of 7.5 feet at low water.

The original projects of 1827 to 1885 proposed to improve the upper 20 miles by dredging and by jetty contraction of the channel; to close the New Inlet Channel; to dike the river from New Inlet 3 miles downstream, and to improve the bar by the consequent increased scour of the river as well as by occasional dredging—all to secure a 16-foot channel from Wilmington to the ocean.

The total final cost of this work under the projects of 1827 to 1885 was in 1889 estimated to be $2,489,500.85.

New projects of 1889 extended the work of the proposed improvement to obtain a depth of 20 feet at low water from Wilmington to the ocean at a total increased cost of $1,800,000.

To June 30, 1892, $2,618,100.14 has been expended upon this work.

At that date the depth on the bar at mean low water was not less than 17 feet, and not less than 16 feet thence to Wilmington for a width of 270 feet, excepting at Snows Marsh Channel, where the minimum depth was 16 feet and the minimum width 40 feet, and excepting, also, at Lilliput Shoal, 11 miles below Wilmington, where for a distance of 300 feet the minimum depth was 15 feet. The minimum channel depth then was, therefore, 17 feet upon the bar and 15 feet in the river.

With the amount applied during the fiscal year ending June 30, 1893, the channel 20 feet in depth has been increased in length 812 feet at Brunswick River Shoal, and a channel 18 feet deep and 37 to 73 feet wide has been cut through Brunswick River, Midnight, and Reeves Point shoals, aggregating 3.1 miles in length, and 82,116 cubic yards of material has been redredged by the U. S. suction dredge *Woodbury* and by contract from the shoal at Snows Marsh Channel. At high water a vessel has passed down the river drawing 18 feet 3 inches from Wilmington to Southport and thence 20 feet 3 inches over the bar to sea, the rise of tide being 2.5 feet at Wilmington and 4.5 feet at the bar.

Amount (estimated) required for completion of existing project, if to 18 feet, $400,000, if to 20 feet, $1,430,000; amount that can be profitably expended in fiscal year ending June 30, 1895, $400,000.

COMMERCE.

Commerce, foreign and domestic, for the year ending December 31, 1892.

[Itemized statistics furnished by Col. J. L. Cantwell, secretary of Wilmington Produce Exchange.]

Articles.	Quantity.	Rate.	Value.	Tonnage.
EXPORTS.				
Cotton ..... bales..	151,520	$40.60	$6,157,712	37,880
Spirits turpentine ..... casks..	58,034	15.08	875,153	11,607
Rosin ..... barrels..	273,291	1.40	382,607	45,548
Tar ..... do....	69,091	1.70	177,455	11,515
Crude turpentine ..... do....	16,216	1.90	30,810	2,702
Lumber ..... M feet..	25,874	13.78	356,544	51,748
Pitch ..... barrels..	5,202	2.30	11,965	867
Peanuts ..... bushels..	102,291	.90	92,062	1,279
Cotton goods ..... packages..	1,818	150.00	272,700	606
Yarns ..... do....	218	80.00	17,440	73
Paper stock ..... do....	662	5.00	3,310	66
Shingles ..... per M..	10,274	5.50	56,507	4,109
Spirits turpentine ..... cases..	21	4.00	84	2
Tar ..... do....	2,629	2.00	5,258	132
Miscellaneous (estimated)	.....	.....	4,250,000	56,667
Total	.....	.....	12,689,607	224,801
IMPORTS.				
Miscellaneous (estimated)	.....	.....	8,750,000	116,667
Total exports and imports	.....	.....	21,439,607	341,468

Tonnage of vessels of 100 tons and over for year ending December 31, 1892.

Vessels.	Foreign.		American.		Total.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
Steamers	22	33,409	53	44,293	75	77,702
Barks	65	30,900	.....	.....	65	30,900
Brigs	11	2,750	5	1,538	16	4,288
Schooners	11	1,520	127	38,169	138	39,689
Total	109	68,579	185	84,000	294	152,579

NOTE.—No record is kept of vessels of less than 80 tons.

It appears from the published report of the president of the Wilmington Produce Exchange for the calendar year 1892 that the shipment of cotton from Wilmington was 163,510 bales in 1892, against 160,267 bales in 1891; that in 1891 the receipts of cotton decreased at New Orleans 30 per cent, at Savannah 24 per cent, at Charleston 40 per cent, and at Norfolk 49 per cent, while it increased at Wilmington 1¼ per cent; that the receipts of spirits of turpentine were 57,536 casks in 1892, against 58,999 casks in 1891; of rosin, 261,894 barrels in 1892, against 294,520 barrels in 1891; of tar, 67,142 barrels in 1892, against 68,798 barrels in 1891; of crude turpentine, 14,855 barrels in 1892, against 13,924 barrels in 1891; and that 29,026,414 feet of lumber were exported in 1892, against 26,115,927 feet in 1891.

PAMLICO AND TAR RIVERS, NORTH CAROLINA.

The Pamlico and Tar rivers are different portions of a single stream. The upper portion, called the Tar, has a total length of about 180 miles and a drainage area of 3,200 square miles, and changes its name to the Pamlico at the town of Washington, N. C. The Pamlico has a further length of about 37 miles and a further drainage area of 1,700 square miles, and finally widens out into Pamlico Sound. The combined rivers, therefore, have a total length of about 217 miles and a total drainage

area of 4,900 square miles. Prior to governmental improvement in 1876 the Pamlico River had an available depth of only 3 feet at low water in its upper portion near Washington; thence Tar River had, during eight months of the year, an available depth of from 2 to 3 feet for 49 miles, up to Tarboro, its practicable limit of navigation; but its channel was almost completely obstructed by floating and sunken stumps and logs and by overhanging trees.

The project is that adopted in 1875 to secure by dredging and removal of war obstructions a clear and safe channel 9 feet deep at low water up to Washington, extended in 1879 to clear a channel 60 feet wide, 3 feet deep at low water 22 miles farther to Greenville, and 20 inches deep at low water 26 miles farther to Tarboro; again extended in 1889 to clear the river to its natural dimensions 40 miles farther to Little Falls, 2 miles below Rocky Mount, by removal of war obstructions, snags, logs, stumps, and overhanging trees, at a total final cost estimated in 1891 at $137,200.

Under this project $88,000 have been appropriated and $84,926 expended to June 30, 1893.

In June, 1892, vessels could carry 7 feet of water at all seasons up the Pamlico 39 miles to Washington, whence 48 miles to Tarboro there was, for boats of 4 feet draft, an intermittent navigation of a variable duration of seven to nine months annually, less intermittent and of longer continuance to Center Bluff and Greenville, 31 and 22 miles above Washington. At ordinary low water of three to five months' duration annually boats could draw 2½ feet to Greenville and Center Bluff, 20 inches to Tarboro, and about 18 inches to Little Falls.

Vessels occasionally struck stumps and snags in the channel for about 3 miles below Washington, between which and Greenville boats were annoyed by snags and overhanging trees, of both of which the river was well cleared from Greenville to Tarboro, whence a practicable channel was cleared to Rocky Mount.

With the amount applied during the fiscal year ending June 30,1893, the channel has been cleared of snags, logs, and stumps, and the banks of overhanging trees from a point 2 miles above Greenville down 24 miles to Washington, and 6,700 feet of the channel below Washington has been cleared of stumps to the depth of 9 feet, so that vessels can safely draw 8 feet of water at all seasons.

The amount required to complete the existing project is $49,200.

For improving the channel by jetties for 3 miles below Greenville, completing the removal of stumps and snags from the channel below Washington, for maintaining a channel clear of snags and overhanging trees up to Tarboro, and for contingent expenses, $17,000 should be appropriated for the fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

The commerce for the year ending December 31, 1892, is estimated as follows:

Class of goods.	Tons.	Class of goods.	Tons.
Cotton	3,794	Turpentine, crude and spirits of, and rosin	437
Cotton seed, meal, and oil	1,099	Lumber and its products	63,656
Tobacco	6	Fertilizers	2,500
Rice	568	Machinery	30
Grains	2,185	General merchandise	954
Vegetables, including truck	26,548	Coal and minerals	4,325
Live stock, including poultry	44		
Meats and their products	36		
Fish and shellfish	250	Total	107,097
Tar	665		

This improvement has been of great benefit to Washington, Greenville, Tarboro, and the country adjacent to the river. The present rates of freight are from 12 to 50 per cent less than they were before the improvement.

The steamers plying this river are of great benefit in regulating freight rates by rail.

ROANOKE RIVER, NORTH CAROLINA.

The Roanoke River, entering into the Albemarle Sound, has, with its tributaries, a total length of about 400 miles and a drainage area of 9,200 miles, 2,050 of which are situated below the confluence of its two main tributaries, the Dan and Staunton.

When placed under Governmental improvement in 1872, this stream possessed a 10-foot depth of channel from its mouth 61 miles up to Hamilton; thence a 5-foot depth 68 miles farther to Weldon (about eight months per year), this channel depth being reduced during the low-water season to 10 feet to Hamilton and 2 feet to Weldon. Over the whole 129 miles the river was more or less obstructed by snags, fallen trees, rocky bars, and by war obstructions.

The original projects of 1872, as since continued to date, contemplated the removal of the war blockades, a few rocky bars, and all sunken logs, snags, floating and other obstructions, and the contraction of the channel way by jetties so as to assure during the entire year an unobstructed 10-foot navigation up to Hamilton and 5-foot navigation up to Weldon, at an estimated cost of $269,000.

To June 30, 1892, $131,120.65 had been expended upon the improvement.

At that date the natural channel depth was not less than 10 feet from the mouth 67 miles to Indian Highland Bar at extreme low water, and was at ordinary low water not less than 5 feet, thence 62 miles to Weldon, except upon sand bars 150 feet long at Spring Gut, 21 miles above Hamilton, about 1,600 feet long at Halifax, 57 miles above Hamilton, and about 800 feet long, 1¼ miles below Weldon, and upon a ledge of rock about 2,800 feet in length, extending from old Weldon Ferry up to old Weldon Landing, the depth at these four localities being about 4 feet at ordinary low water, assumed at the zero of the Weldon gauge.

For about 25 of the 44 miles between Jamesville and Hamilton navigation was very considerably obstructed by overhanging trees and by snags, and from a point about 7 miles above Hamilton up to apoint about 43 miles above it trimming of about 12½ miles of bank was needful; otherwise the river was in good navigable condition.

With the amount applied during the fiscal year ending June 30, 1893, the channel for the greater part of the 25 miles most obstructed below Hamilton has been entirely cleared, and 17¼ miles of single bank has been cleared to the width of 20 feet.

The improvement of this river has been of great benefit, as it drains a country remote from railroads.

COMMERCIAL STATISTICS.

The total amount of commerce for the year 1891 was 376,181 tons.

Freight rates are mucher cheaper by water than by rail. The rate on cotton from Weldon to Norfolk by rail is $1.35 per bale, while by water it is 90 cents per bale.

Several large steamers now run up to the penitentiary farms about 4 miles below Weldon, and as these farms (three in number) are right on the river, the shipping of their produce by water is of very great benefit.

LUMBER RIVER, NORTH AND SOUTH CAROLINA.

Lumber River is a river of about 250 miles length and about 1,860 square miles of drainage basin. It rises at a point about 60 miles southwest of Raleigh, N. C., then flows in a general southeasterly and afterward southwesterly direction, and empties into the Little Peedee River at a point about 160 miles from the Atlantic Ocean.

Before improvement the river was obstructed by logs, snags, stumps, overhanging trees, and in places by sand bars. Long reaches were in fair condition. That portion of the river between Lumberton and the North Carolina line was crossed by 5 low bridges without draw spans and 1 moderately high railroad bridge near Lumberton. In South Carolina the river was crossed by 2 bridges without draws.

The project provides for improving the river for steamboats from its mouth to Lumberton, a distance of 70.8 miles, by snagging and clearing the banks, at an estimated cost of $35,000.

Fifteen thousand dollars have been appropriated for this work, and $13,067.96 had been expended up to June 30, 1893.

Two small steamers have run irregularly on this river for the past year. The amount of freight carried was 7,154 tons, consisting mainly of cotton and lumber.

The work up to now has been chiefly snagging. The railroad bridge in South Carolina is now being supplied with asteel draw. The bridges in North Carolina have already been provided with draw spans or discontinued.

The engineer in charge recommends that work be continued as heretofore, and that in addition the river be dredged where needed to provide a good navigable channel for the steamers which will soon be run on this stream.

Amount required to complete the improvement, $20,000; amount that can be profitably expended in ensuing fiscal year, $20,000.

COMMERCE.

There was no commerce on the river previous to 1890. The commerce for that year was 5,100 tons; that of 1893 was 7,154 tons, showing an increase of 2,054 tons.

There is one of the largest saw and shingle mills at Bee Bluff, on the river, in the South.

BLACK RIVER, NORTH CAROLINA.

The Black River, North Carolina, a tributary of the Cape Fear River, has (with its own main tributary, South River) a total length of about 175 miles, and a drainage area of about 1,547 square miles.

When placed under Governmental improvement, in 1886, this stream possessed a moderately well-cleared channel from its mouth (in the Cape Fear River, 15 miles above Wilmington) 22 miles upward to Point Caswell, with 2.5 feet depth at low water and 4 feet depth at high tide; thence a roughly cleared navigation 48 miles farther to near Lisbon, with 2.5 feet depth during nine months per year, and with 6 feet depth during six months per year. A steamer of 2.5-foot draft was regularly running once or twice per week all the year to Point Caswell, and nine months per year to Clear Run (about 7 miles below Lisbon).

The project of 1885 is to apply at least $10,000 to removing logs, snags, and overhanging trees from the bed and banks, and rounding off a few of the sharpest bends in the river from its confluence with the

Cape Fear up 86 miles to Lisbon. In 1893 it was modified to confine the improvement 78 miles up to Clear Run.

To June 30, 1892, $3,000 had been expended upon this work.

At that date navigation was unobstructed from the mouth 34 miles to Haws Narrows, excepting a few trees in the channel and leaning from the banks in the 6 miles next below Point Caswell, and between it and Haws Narrows, through which shoals of sand formed by logs reduced the depth to 18 inches. In the next 14 miles to South River Narrows navigation was not obstructed, but thence 34 miles to Lisbon was badly obstructed by snags, logs, stumps, and overhanging trees.

With the amount expended during the fiscal year ending June, 30, 1893, the channel and banks have been cleared from Clear Run down 18 miles.

The amount now available will be applied to clearing the channel through all the obstructions. For its maintenance until June 30, 1895, $3,000 should be appropriated.

There is a very active traffic in naval stores and farm products, poultry, eggs, etc., on this river and a considerable traffic in lumber, shingles, and juniper bolts, besides logs, which are rafted down in considerable quantities.

Up to Point Caswell, 24 miles above its confluence with the Cape Fear River a draft of 4 feet can be carried at low stage. In the 28 miles next above Point Caswell there are three localities, known as Goffs, Haws, and South River (or Beattys) narrows, the former 2 miles and the two latter each 4 miles in length, where the natural channel is very narrow, crooked, and shallow, the water spreading laterally through cypress swamps.

The clearing of the river has not yet descended to the uppermost of these shoals, and the removal of the snags and logs from them against which sand is collected forming bars, may result in a sufficient increase in depth; if not, should the commerce of the river continue to increase, it may be expedient to apply a further sum of $10,000 to $15,000 to closing outlets by dikes and rounding off sharp bends in these now shallow narrows.

COMMERCE.

The commerce for the year ending December 31, 1892, is estimated as follows:

Class of goods.	Tons.	Class of goods.	Tons.
Cotton	78	Tar	1,260
Cotton seed, meal, and oil	12	Turpentine, crude, and spirits of, and rosin	17,273
Tobacco	34	Lumber and its products	32,800
Rice	106	Fertilizers	350
Grains	345	General merchandise	3,259
Vegetables, including truck	128	Coal and minerals	30
Live stock, including poultry	98		
Meats and their products	251	Total	56,051
Fish and shellfish	27		

The traffic of places about equally near the railroad and river is chiefly by the river at freight rates lower than by rail.

INLAND WATER ROUTE FROM NORFOLK, VA., TO ALBEMARLE SOUND, NORTH CAROLINA, THROUGH CURRITUCK SOUND.

This is one of the most important links in the chain of inland water communication along the Atlantic coast. It connects Chesapeake Bay with Albemarle Sound, and is composed of the following bodies of water: Elizabeth River, North Landing River, Currituck Sound, Coanjock Bay,

North River, and the Albemarle and Chesapeake Canal. With the exception of the canal, which was constructed and is maintained by private enterprise, all are natural waterways.

Before any improvement was undertaken by the Government there was over this route an indifferent channel 5 to 7 feet deep at low water, the navigation of which was obstructed by snags, overhanging growth, and sharp bends in all the rivers.

The North Landing River, 17 miles long, was under improvement between 1879 and 1887. At a cost of $49,777.34 a channel 80 feet wide and 9 feet deep was secured. Currituck Sound, Coanjock Bay, and North River Bar, 13½ miles, were under improvement between 1879 and 1890. At a cost of $141,656.16 a channel 80 feet wide and 9 feet deep was secured through the sound, and a channel of the same depth 40 feet wide through the bay and over the bar.

The project adopted is a channel 80 feet wide and 9 feet deep at low water over the entire route, about 58 miles, by dredging, removing obstructions, and constructing a dike. The projected dimensions have been already secured over nine-tenths of this distance.

Steady progress has been made toward securing this result, and at present the regular steamboat lines running between North Carolina ports and Norfolk and Baltimore employ vessels whose maximum dimensions are: Length, 190 feet; width, 25.2 feet; draft, 8 feet, and tonnage, 421.

The amount expended on this improvement to June 30, 1892, was $243,832.28.

Nine thousand dollars was appropriated for this improvement by act of July 13, 1892, and a contract was made with Chester T. Caler, of Norfolk, Va., to do the required dredging, the work to be completed by April 30, 1894. Operations under this contract have not yet been commenced.

There was expended on this improvement during the fiscal year ending June 30, 1893, $38.83, applied to office expenses, reading tide gauges, etc.

The amount (estimated) to complete existing project $49,667.08; this entire amount could be profitably expended in fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

[From records of Albemarle and Chesapeake Canal Company.]

Number, class, and tonnage of vessels passing through the inland water route from Norfolk, Va., to Albemarle Sound, North Carolina.

Year ending—	Steamers.	Schooners.	Barges.	Lighters.	Sloops.	Rafts.	Tonnage.
June 30—							
1885	2,976	1,059	633	133	204	181	.....
1886	3,271	1,082	549	55	178	244	336,737
1887	3,369	1,216	568	49	181	297	358,111
1888	3,862	1,362	361	44	265	378	435,745
1889	4,065	1,539	683	82	352	352	445,237
Jan. 1—							
1890	4,169	1,699	878	67	446	335	454,950
1891	4,068	1,304	1,000	113	394	350	455,442
1892	4,061	1,817	1,150	62	329	298	467,113
1893	4,026	1,077	1,109	82	281	350	440,319

Approximate amount of all kinds of freight passing through this route.

	Tons.
1888	335,757
1889	372,618
1890	403,111

This route has been of great benefit in reducing and regulating freight rates by rail.

GREAT PEDEE RIVER, SOUTH CAROLINA.

This river emptying into Winyaw Bay at Georgetown, S. C., has (including its upper portion, called the Yadkin) a total length of about 500 miles and a drainage area of 16,329 square miles. The project for its improvement adopted in 1880 proposed to secure a thoroughly cleared 9-foot navigation to Smiths Mills, 52 miles from its mouth, and thence a 3.5-foot navigation to Cheraw, the present head of steam navigation, 171 miles above Georgetown, at an estimated cost of $117,000.

Before improvement the river was dangerously obstructed by snags and logs everywhere. Boats drawing 9 feet of water were able to reach Smiths Mills, 52 miles above the mouth. Those drawing 3½ feet at low water could get 54 miles farther up, to Little Bluff, or at high water to Cheraw, 172 miles from the mouth.

The total amount appropriated for this work is $89,500; the amount expended to June 30, 1893, was $83,321.72.

The river has been quite thoroughly cleared by plant owned and operated by the United States for a width of 80 feet and depth of 4 feet at low water between points no miles and 172 miles above the mouth. The average cost of removing obstructions was $1.38 each.

The amount required to complete the existing project, $27,500; all of which can be profitably expended in fiscal year ending June 30, 1895.

COMMERCE.

		Number.	Tons.	Value.
Outward freights.				
Rosin	barrels	21,345	4,269	$42,690
Spirits turpentine	do	3,391	678	50,865
Cotton	bales	3,610	903	126,350
Ton timber	sticks	58,949	58,949	176,847
Shingles		9,163,000	4,581	73,304
Eggs	crates	275	4	550
Pease	bushels	300	9	375
Rice, rough	do	206,343	4,746	206,343
Lumber	feet, B. M.	4,000,000	6,667	60,000
Wood	cords	2,800	2,800	5,600
Tar	barrels	850	170	1,700
Cross ties	No.	33,000	2,640	9,900
Miscellaneous articles. Hides, wool, staves, etc.		.....	400	20,000
Total		.....	86,816	774,524
Inward freights.				
General merchandise		.....	7,845	392,350
Grand total		.....	94,661	1,166,874

This shows an increase of 2,190 tons over that given in 1892, but decrease in value owing to low prices pertaining to some of the products of the country. There are other freights carried by pole boats and smaller craft of which no account whatever could be obtained. Commerce has been carried on by seagoing schooners of 250 to 300 tons, tugboats, and steamer *Maggie* to Port Harrelson and Smiths Mills, and steamers *Merchant, John M. Cole,* and *Santee* to Cheraw, head of navigation.

The improvement has been of marked benefit to navigation.

SANTEE RIVER, SOUTH CAROLINA.

The Santee River, formed by the Congaree and Wateree rivers, and emptying into the Atlantic Ocean just south of Winyaw Bay, has from the sea to its headquarters in the mountains a total length of about 500 miles, and a drainage area of 15,414 square miles. It was formerly

navigated by 4-foot draft boats from the sea up to Columbia on the Congaree and Camden on the Wateree.

In 1880, the date of commencement of governmental improvement, the navigation was considerably obstructed and blocked at all stages of water by sunken logs, snags, and floating timber. Its bar entrance was narrow, crooked, and shifting, with only about 4 feet depth of water at low tide, and so situated as to be very difficult and expensive to improve. Four steamers and a few small vessels were then running upon portions of the river.

The project provides for leaving the Mosquito Creek Canal, which has been completed for about $100,000, as a lumber route, and for a new cut between Estherville and Minim Creek at an estimated cost of $250,000, and for completely snagging the Santee River itself at a cost of $100,000. During the past year dredging on the new canal continued till September 30, when it was suspended during the building of a new and powerful dredge by the United States. A new and better right of way was secured by purchase.

Up to June 30, 1893, $143,559.63 has been spent in giving a passage 30 feet wide and 5 feet deep at high water from Santee River to Winyaw Bay, in building a drawbridge over Mosquito Creek, in replacing damaged rice drainage, and dredging on the new Estherville-Minim Creek Canal.

The Mosquito Creek Canal passage has continued to be almost indispensable to the public in trading between the Santee River and Georgetown.

It is respectfully recommended by the engineer in charge that the Mosquito Creek route be maintained at a cost not to exceed $6,000 per year, and that dredging on Estherville-Minim route be continued, and that a good channel of at least 80 feet width and 4 feet depth at dead low water be provided and maintained in the Santee River proper, so as to permit steamers to run uninterruptedly throughout the whole year.

The amount (estimated) required to complete the existing project, $290,000, and the amount that can be expended to advantage in fiscal year ending June 30, 1895, is $200,000.

COMMERCE IN 1893.

	No.	Tons.	Value.
Outward.			
Cotton ..... bales..	22,000	5,500	$700,000
Rosin ..... barrels..	161,000	35,000	191,000
Spirits of turpentine ..... do....	26,450	5,200	361,000
Timber ..... pieces..	23,000	39,400	131,000
Railroad ties	46,000	3,500	13,800
Wool ..... pounds..	50,000	25	12,500
Hides ..... do....	20,000	10	12,000
Seed oats ..... bushels..	10,000	302	6,000
Rice, rough ..... do....	125,000	30,000	150,000
Staves	500,000	500	2,500
Wood ..... cords..	10,000	10,000	12,500
Game and fish	.....	45	2,300
Total	.....	102,482	1,594,600
Inward.			
General merchandise	.....	21,700	1,085,000
Total	.....	124,182	2,679,600

The above shows an increase of 13,659 tons, but a decrease in value over that of 1892.

WACCAMAW RIVER, SOUTH CAROLINA.

This river, emptying into Winyaw Bay at Georgetown, S. C., has a total length of about 245 miles and a drainage area of 1,572 square miles of rich agricultural lands.

In 1880 this stream was navigable for 12-foot boats at all stages of water from Georgetown 23 miles to Bull Creek, and at high water 4 miles further to Bucks Lower Mills; thence for 7-foot-draft boats at high water 22 miles further to Conway; thence it possessed an obstructed channel for 3-foot-draft boats at ordinary winter water 68 miles to Reeves Ferry; thence an obstructed channel with 3 feet at high water for 30 miles to Lake Waccamaw.

The original project of 1880, as continued to date, proposed to secure a channel 12 feet deep at all stages of water, with 80 feet bottom width, from the mouth of the river 66 miles upward to Conwayboro, and afterwards a cleared channel 178 miles further to Lake Waccamaw, at an estimated cost of $138,400.

The work so far has been chiefly snagging and has resulted in great benefit to navigation. Up to June 30, 1893, $83,098.70 has been spent, giving a thoroughly cleared channel 100 feet least width, 7 feet deep at low water as far as Conway, and 40 feet wide and 3 feet deep 68 miles above Conway.

Amount (estimated) required for completion of existing project, $50,500; amount that can be profitably expended in fiscal year ending June 30, 1895, $30,000.

COMMERCE IN 1893.

		Number.	Tons.	Value.
Outward freights.				
Rosin	barrels	53,167	10,633	$106,334
Spirits turpentine	do	10,893	2,179	163,395
Crude turpentine	do	1,330	266	2,660
Tar	do	1,238	248	2,476
Cotton	bales	17,230	4,307	603,050
Rough rice	bushels	195,279	4,491	195,279
Rice, clean	barrels	19,945	3,490	299,175
Rice flour	bushels	25,000	250	7,500
Hides	bales	3	1	200
Wool	do	5	1	400
Clams	barrels	2,121	424	8,484
Fish	do	363	19	95
Lumber	feet, B. M.	6,700,000	11,167	100,500
Timber	pieces	10,000	20,000	50,000
Shingles		7,000,000	3,500	56,000
Total		.....	60,976	1,595,548
Inward freights.				
General merchandise		.....	10,000	500,000
Total		.....	70,976	2,095,548

This shows a decrease over last year's statement, owing principally to depression in the lumber and shingle trade and very low water in Upper Waccamaw, causing freights to be hauled across country to small sea coast inlets and carried thence to Wilmington, N. C., by sailing craft, as well as the fact that the inward freights on the Great Pedee last year were added to those of the Waccamaw. It was true that those bound for the Great Pedee pass over the first 30 miles of the Waccamaw before entering the former river, but for fear that this might be misleading to those interested in the commerce of the Waccamaw the freights in question were left off the Waccamaw statement. The commerce has been carried on by seagoing vessels of about 300 to 400 tons and steamers of 15 to 300 tons.

WAPPOO CUT, SOUTH CAROLINA.

Wappoo Cut is a narrow, tortuous tidal stream, separating James Island from the mainland and connecting Stono and Ashley rivers.

This stream is of considerable commercial importance. It is the first link in the chain of inland navigation which extends from Charleston to Florida.

The project provides for securing a sufficiently straight and continuous channel 60 feet wide between low-water lines and 6 feet deep at low water from Ashley to Stono rivers. The bulk of the work is dredging. To maintain the channel two training walls at Stono entrance and three closing dams are to be made and some bank protection done. The estimated cost is $88,000.

Total expenditures to June 30, 1893, $50,284.28.

There is now a narrow 6-foot channel all the way through from Ashley to Stono river.

During the past year a brush and stone dam 220 feet long was built to close the old route just east of Elliott Cut. Eight hundred feet of the north bank of Elliott Cut was revetted with stone, and 460 feet more were protected at the foot of the slope. Considerable dredging was done at two points where insufficient depths existed.

Amount required to complete existing project, $35,000; this entire amount can be profitably expended in ensuing fiscal year.

COMMERCIAL STATISTICS.

Articles.	1891.		1892.	
	Quantity.	Value.	Quantity.	Value.
Phosphate rock ..... tons..	75,000	$525,000	65,000	$300,000
Sea island cotton ..... bags..	12,000	800,000	10,000	850,000
Rice ..... bushels..	240,000	250,000	400,000	300,000
Vegetables ..... crates..	90,000	160,000	95,000	200,000
Fertilizers ..... tons..	1,400	21,000	3,000	37,500
Lumber ..... feet..	25,000,000	200,000	30,000,000	275,000
Shingles, cross-ties, and other articles	.....	20,000	50,000	35,000
Total	.....	1,976,000	.....	1,997,500

This greatly improved inland route to the Sea Islands, Beaufort, Savannah, and Florida now allows vessels to go in and out with about same regularity of any our tide streams, and now even a pleasure route for the pleasure yachts, and no towage dreaded by flatboats or sail crafts, or tugs having in tow loaded lighters, for the water is there.

WATEREE RIVER, SOUTH CAROLINA.

The Wateree River, which unites with the Congaree to form the Santee, has, including in its upper portion, called the Catawba, a total length of about 310 miles and a drainage area of some 5,642 square miles.

When placed under governmental improvement, in 1882, this stream had a low-water depth of from 3 to 4 feet from its mouth in the Santee upward 68 miles to Camden, its practical limit of steam navigation. From its mouth upward 14 miles the river was completely blocked at all stages of water by sunken logs and stumps and by floating obstructions, and at moderate stages by the bridges of the South Carolina and the Wilmington, Columbia and Augusta railroads, then without draw

spans; thence 54 miles, to Camden, navigation was possible, but dangerous except during high water. Its commerce was practically nothing.

The present project provides for safe and unobstructed 4-foot navigation over this entire distance at all stages of water.

The appropriation of September 19, 1890, completed the amount that this improvement was estimated to cost. By the expenditure of this sum the entire portion of the river covered by the project has been put into good condition for steamboat navigation. For its maintenance the snag boat owned by the river should be kept at work continuously. The stream is well worth this expense, which would amount to about $6,500 a year. If appropriations are made every two years, $13,000 could be advantageously spent in that period.

The small sum, $2,500, supplied in the river and harbor act of July 13, 1892, has sufficed for the past year, as a balance of $8,860.13 was on hand from previous acts, but to keep this important river open for its increasing commerce the sum asked for is absolutely essential for maintenance.

Amount that can be profitably expended in fiscal year ending June 30, 1895, $6,500.

COMMERCE IN 1893.

	No.	Tons.	Value.
Outward freights.			
Cotton ..... bales..	570	143	$20,950
Resin ..... barrels..	18,000	3,600	36,000
Cotton-seed oil ..... do....	470	112	3,190
Rice, rough ..... bushels..	10,000	230	10,000
Oak staves ..... number..	7,000	17	42
Hay ..... tons..	12	12	216
Cotton seed ..... do....	483	483	10,626
Linters	30	8	600
Cotton-seed hulls ..... tons..	20	20	60
Total	.....	4,625	86,684
Inward freights.			
General merchandise	.....	1,617	31,045
Total	.....	6,242	117,729

This statement shows an increase over last year of 3,998 tons. The commerce has been carried on by one steamer of about 200 tons, making irregular trips.

CONGAREE RIVER, SOUTH CAROLINA.

The Congaree River, formed by the Broad and Saluda rivers, and itself uniting with the Wateree to form the Santee, has (from the head waters of its tributaries in the mountains down to its mouth in the Santee) a total length of about 250 miles and a total drainage area of about 8,312 square miles. The name Congaree applies properly to the 50 miles from the Santee upward to the confluence of the Broad and Saluda, just above Columbia, S. C.

When placed under governmental improvement in 1886 this stream had a low-water depth of from 3 to 4 feet from its mouth 48 miles upward to the railroad bridge at Columbia, and thence 1 foot low-water depth 2 miles farther to its head; the navigation of the lower 47 miles from the mouth to Granby was blocked at all stages of water by the South Carolina Railway Bridge, and by sunken logs, snags, and overhanging trees. The navigation of the upper 3 miles above Granby was

prevented by swift current and numerous rock ledges and bowlders. Its commerce was nothing.

Total expenditures to June 30, 1893, $21,992.26.

The river has been snagged between points no miles and 47 miles above the mouth, 5,014 obstructions having been removed. The railroad bridge had been provided with a draw. Much good has resulted.

It is respectfully recommended by the engineers in charge that a good navigable channel be provided and maintained to at least 80 feet width and 4 feet depth at dead low water, so as to permit steamers to run uninterruptedly throughout the whole year from mouth of river to Gervais Street Bridge at the city of Columbia.

Amount (estimated) required to complete existing project, $29,500. This entire amount can be profitably expended in ensuing fiscal year.

Commerce.

	1891.			1892.			1893.		
	No.	Tons.	Value.	No.	Tons.	Value.	No.	Tons.	Value.
Outward freights.									
Cotton.....bales..	100	25	$5,000	150	38	$5,250	225	56	$7,875
Spirits turpentine.....barrels..	218	41	4,360	303	30	77,575	250	50	3,750
Resin.....do....	8 200	1,435	11,480	10,975	2.743	16,450	6,500	1,300	13,000
Hay.....bales..	.....	.....	.....	.....	.....	.....	500	75	1,500
Cotton seed ....tons..	.....	.....	.....	.....	275	2,750	500	500	5,000
	.....	1,501	20,840	.....	3,086	32.025	.....	1,981	31,125
Inward freights.									
General merchandise.....	.....	900	27,000	.....	600	30,000	.....	800	40,000
Total.....	.....	2,401	47,840	.....	3,686	62,025	.....	2,781	71,125

The above shows a falling off in tonnage, but an increase in value over last year. The commerce has been carried on by one steamer of 200 tons making very irregular trips, and for long periods not running at all. Certainly such imperfect service does not tend to increase the commerce largely or rapidly.

When the river is once thoroughly cleared of obstructions and a regular line of large steamers established the commerce will probably grow to be worth from $1,000,000 to $3,000,000 a year.

The commerce of the city of Columbia amounts to about $10,000,000 annually, as reported by the board of trade of that place, and is on the increase. It has been stated that whenever the steamers are run with regularity and dispatch to a point as near Columbia as they can get a great deal of freight will be shipped to and from that city by them and that the rates of transportation will be greatly reduced.

MINGO CREEK, SOUTH CAROLINA.

Mingo Creek, South Carolina, is a river of about 45 miles in length and 200 square miles of drainage basin, lying wholly in Williamsburg County, S. C. It rises at a point about 12 miles east of Kingsville, S. C., flows in a general southeasterly direction, and empties in Black River at a point about 41 miles (by water) from Georgetown, S. C. From the mouth of the Mingo downward to the Atlantic Ocean there is already a freely navigable channel of at least 400 feet width and 9 feet depth at low water. From the mouth of Mingo Creek up to Williams Landing, a distance of 21 miles, the present channel is from 120 to 150 feet wide and from 5 to 9 feet deep, but was so obstructed by stumps, snags, and sunken logs that navigation was almost impossible.

The project provides for improving the river for steamboats from its mouth to Williams Landing, and for pole boats at high water up to the head of navigation, by snagging and clearing the banks, at an estimated cost of $17,000.

The creek has been quite thoroughly cleared by plant owned and operated by the United States for a width of 40 feet and depth of 4 feet at low water, between points no miles and 15 miles above the mouth. The average cost of removing obstructions was 86 cents each.

Total expenditures to June 30, 1893, $11,546.02.

Amount (estimated) required to complete existing project, $4,000. All of this can be profitably expended in ensuing fiscal year.

COMMERCE IN 1893.

	Number.	Tons.	Value.
Outward freights.			
Spirits turpentine.....barrels..	12,000	2,400	$216,000
Rosin.....do....	70,000	14,000	185,000
Crude turpentine.....do....	5,000	1,250	15,000
Cypress, oak, and pine staves.....	75,000	190	4,500
Wood.....cords..	12,000	12,000	36,000
Hoop poles.....	25,000	25	4,500
Cotton.....bales..	7,500	1,850	300,000
Shingles.....	700,000	350	5,600
Other produce.....tons..	.....	600	35,000
Lumber, timber, etc.....	.....	45,000	200,000
Total.....	.....	77,665	1,001,600
Inward freights.			
General merchandise.....	.....	17,000	750,000
Total.....	.....	94,665	1,751,600

The commerce has been carried on by two steamers of 100 tons and 20 tons, respectively, and a number of pole boats, rafts, etc.

Parties using river report much benefit from the work already done.

LITTLE PEEDEE RIVER, SOUTH CAROLINA.

This is a river of about 220 miles length and about 1,200 square miles of drainage basin. It rises in Richmond County, N. C., at a point about 80 miles southwest of Raleigh, and flows in a general southerly direction along or through Marlboro, Marion, and Horry counties, S. C., and empties into the Great Pedee River about 60 miles from the Atlantic Ocean. From its mouth to the Atlantic Ocean there already exists a navigable channel of at least 150 feet width and 9 feet depth at low water.

The river, for the most part, flows through an exceedingly fertile country, far removed from any regular transportation lines. For this reason the people are forced to haul, by wagons, their products and supplies long distances to and from market, at considerable more expense than they might be transported by steamer.

The river was much obstructed by snags and overhanging trees, and in places was divided into several branches, in neither of which there was a good channel, and by ten bridges without draws.

The project adopted in 1888 proposes to snag the river and close unnecessary branches, providing for steamboat navigation up to the mouth of Lumber River and pole-boat navigation thence to Little Rock, at an estimated cost of $50,000.

Total expenditures to June 30, 1893, $12,583.86. All the bridges have been provided with draws. The river has been quite thoroughly cleaned for a width of 40 feet and depth of 3 feet at low water for a distance of 65 miles above its mouth.

Amount (estimated) required to complete improvement, $35,000; amount that can be profitably expended in ensuing fiscal year, $20,000.

COMMERCE IN 1893.

	Number.	Tons.	Value.
Outward freights.			
Rosin ..... barrels..	4,400	880	$8,800
Spirits turpentine ..... do....	750	150	11,250
Cotton ..... bales..	700	175	24,500
Timber ..... sticks..	4,050	4,050	12,150
Shingles	20,000	10	160
Eggs ..... crates..	275	4	550
Pease ..... bushels..	300	9	375
Total	.....	5,278	57,785
Inward freights.			
General merchandise	.....	875	43,750
Grand total	.....	6,153	101,535

This shows a decrease in tons, but an increase in value over last year.

The commerce has been carried on by irregular trips of three steamers (of 30, 60, and 80 tons, respectively), towboats, and rafts.

BEAUFORT RIVER, SOUTH CAROLINA.

The river and harbor act of 1888 provided for a survey of Beaufort River from a point 3 miles south of the town of Beaufort through to Coosaw River, with a view to its improvement, especially at Brickyard.

The 7 miles of Beaufort River next to Coosaw River are generally known as Brickyard Creek. This section of the river forms part of the inland water route between Charleston, S. C., and Florida, which the United States has indicated the intention of improving by work already done at Wappoo Cut, Romerly Marsh, Jekyl Creek, etc. The adopted depth of improved route has generally been between 6 and 7 feet at mean low water.

There was a thoroughly good 7-foot channel between the town of Beaufort and Coosaw River, except at a point called Brickyard, near Coosaw mouth. The least depth here was about 4 feet at low water, and the channel when deep enough was too narrow.

It is proposed to deepen and widen the channel by dredging sufficiently to give a continuously wide 7-foot channel at low water all the way through. The estimated cost is $40,000. The original estimate was $25,000; this amount has been appropriated, but was not sufficient.

A 7-foot channel all the way through has been secured. When it was supposed that the work was very nearly completed, a large quantity of rock, mostly covered with a thin layer of sand, was encountered. While some rock was anticipated, and a price was contained in the contract for rock, the quantity was so large and the price so high that only a 50-foot cut could be completed at this point. This requires widening, as it is in a broad reach without good facilities for ranges, and authority was asked and obtained from the Chief of Engineers to increase the estimated cost by $15,000. This work to be done is essential to derive full benefit from the work already done.

The amount now (estimated) required to complete the improvement, $15,000. All of this can be profitably expended in ensuing fiscal year.

COMMERCIAL STATISTICS.

The amount of freight passing over this stream during 1892 was 250,000 tons, valued at $1,505,000. Six thousand passengers passed over also.

ALTAMAHA RIVER, GEORGIA.

The Altamaha is the most important river in Georgia, lying entirely within the boundaries of that State. It is formed by the confluence of the Oconee and Ocmulgee rivers and has a total length of some 155 miles. It flows in a southeasterly direction and empties into the Atlantic Ocean through Altamaha Sound, below the town of Darien.

A large section of the State of Georgia drained by the Altamaha and its affluents has no other outlets for its products than that river, and its improvement is needed to bring those products to market. The completion of the work undertaken by the Government for improving the navigation will be advantageous to commerce and beneficial to the community generally by reducing the cost of transportation and by encouraging the further development of the timber and naval stores industries and of the rice culture.

Before improvement the chief obstruction to navigation consisted in rock ledges, sand bars, overhanging trees, snags, and sunken logs. The rock ledges were confined to the upper portion of the stream, while the other obstructions were found throughout its entire course. The low-water depths at some points did not exceed 1 foot.

The project contemplates the establishment of a steamboat channel 3 feet in depth at ordinary summer low water, between Darien and the junction of the Oconee and Ocmulgee rivers.

The estimated cost of the improvement is $129,000.

In 1883 channels, 100 feet in width and 4 feet in depth at ordinary low water, were opened through the rock ledges at Town Bluff and Piney Bluff by the removal of 319 and 1,480 cubic yards of rock at these points, respectively.

In 1884–'85 a training wall was built at Beards Bluff for the improvement of a shoal at that locality, and shore protection was constructed for the protection of caving banks.

The total expenditures under the present project up to June 30, 1892, including all outstanding liabilities, amounted to $8,369.11.

During the fiscal year just closed there were constructed at Couper Bar a training wall and 3 spur dams, aggregating 932 feet in length, in the construction of which there were used 4,390·11 cubic yards of brush fascines, 141·51 cubic yards of riprap stone, 12,502.25 feet, B. M., of 6 by 10 inch timber as waling, cross and back ties, and 1,285·4 pounds of iron bolts for fastening the timber to the pile work. There were driven 471 piles, 26 groups of tie piles, and 11 clusters of fender piles, making a total of 556 piles. Old work at Beards Bluff was repaired and 12 new spur dams, 6 new closing dams, and 79 linear feet of shore protection were built at Marrowbone Bar. In this work there were used 231 piles, 1,630 cubic yards of brush mattresses, 230 cubic yards of riprap stone, and 1,252 linear feet of wattling.

There were removed from the river during the fiscal year 24 snags and stumps and 1,305 overhanging trees. Sixteen logs were cut up on bank. In this work there was used 148 pounds of explosives.

The total expenditure during the fiscal year ending June 30, 1893, including all outstanding liabilities, amounted to $18,323.89.

Many of the most dangerous snags and overhanging trees have been removed.

The amount (estimated) required to complete existing project, $99,000; amount that can be profitably expended in ensuing fiscal year, $50,000.

COMMERCE.

The commerce passing over the Altamaha River is derived, not only from the region bordering it, but also from the country bordering its tributaries, the Ocmulgee and the Oconee rivers.

About one-half of the counties bordering the Altamaha River is wholly dependent upon the river for transportation, while the remainder is served in part by two railroads—the East Tennessee, Virginia and Georgia running approximately parallel to the river on its southern side, at an average distance of about 15 miles from it, and the Savannah, Florida and Western crossing the river at Doctortown at about right angles to its general direction. The territory dependent upon the river for the transportation of its produce and supplies is composed of one-third of the counties of Appling, Wayne, Glynn, and all of Tatnall and McIntosh.

The following boats were engaged in traffic on this river during the past fiscal year, viz, *Swan*, running from Crisp to Brunswick; and the *Americus* and the *Altamaha*, discharging their freight at Doctortown, whence it is taken by rail to Savannah. These steamers carry annually about 24,000 tons of freight, valued at more than $930,000.

From the Oconee and Ocmulgee rivers nearly all of the lumber cut has gone through to the coast over the Altamaha. It is believed that 171,000 tons, valued at $684,000, is a conservative estimate of this business for the past year. This, added to the steamboat commerce, gives the total tonnage of the river for the past twelve months as 194,121 tons, valued at $1,614,860.

When the Oconee River is opened to navigation as far as Milledgeville—the Ocmulgee River now being opened up to Macon—and a low-water channel 3 feet in depth is secured on all three rivers, the commerce of the Altamaha will undoubtedly be largely increased. It is impossible to give a close estimate of the increase of business that would follow the completion of the works of improvement, but it is possible that it would increase nearly 200 per cent.

CHATTAHOOCHEE RIVER, GEORGIA AND ALABAMA.

The Chattahoochee River rises in the northern part of Georgia, flowing past the town of Columbus, the proposed head of navigation, where the river forms the boundary line between Georgia and Alabama, the town of Eufaula, Ala., and other towns to Chattahoochee, Fla., where it unites with Flint River to form the Apalachicola. The city of Columbus, situated on this river, has 17,000 inhabitants.

The river was originally much obstructed by logs, snags, and overhanging trees and by a number of rock and marl shoals and sand bars, so that navigation was difficult and dangerous. Steamboats could only run by daylight, and not infrequently lay on sand bars for weeks at a time waiting for a rise in the river. Very many were lost by striking logs and snags.

The present plan of improvement, adopted in 1873 and modified in 1882, contemplates a low-water channel, 4 feet in depth and 100 feet in width, from Columbia, Ga., to Chattahoochee, Fla., a distance of 224 miles, by the removal of snags and other obstructions from the channel and overhanging trees from the banks by the excavations of rock shoals and by works of contraction and shore protection.

Previous to the act of June 18, 1878, $70,000 was appropriated for the "Chattahoochee and Flint rivers," but the amounts apportioned to each river are not known.

The expenditure of $243,545.87, up to June 30, 1892, had resulted in securing and maintaining a fairly good channel between Chattahoochee, Fla., and Eufaula, Ala., except at Rock Island, at all seasons of the year, and between Eufaula, Ala., and Columbus, Ga., except during low water, when considerable trouble was experienced at St. Francis Bend, Shell Creek, Upatoie, Woolfolk, and Mound bars, and at the shoals immediately below Columbus, on account of the lack of funds for keeping in repair and extending the contraction and shore-protection works at those points.

During the fiscal year ending June 30, 1893, $13,315.94 has been expended in snagging operations and in the construction of shore-protection and contraction works at Mound Bar, by which the low-water navigation at this point has been greatly facilitated.

The limited annual appropriations for this improvement have not been sufficient to maintain properly the works of contraction originally constructed nor to extend or modify them as required. At the Mound Bar the caving of the banks has been partly checked and the channel improved by the work of the past year, but the revetments and spur dams will need strengthening and extension. At Woolfolk Bar the banks are caving badly. At the shoals below Columbus, Ga., which were formerly improved by the construction of a series of spur dams of light construction, the dams have been so damaged and washed away that great difficulty was experienced during the last year in passing over this part of the river. Unless sufficient appropriations are made for the renewal and extension of the works at this point, it is very probable that steamboats can not be able to reach Columbus, Ga., during the next low-water season.

Trouble is also experienced at low water at Francis Bend, Shell Creek, and Upatoie bars, above Eufaula, and at Rock Island, about 200 miles below Columbus.

If sufficiently large appropriations were made to improve these localities by substantial works, it is believed that thereafter the navigation of the river could be maintained in good condition throughout the year by annual appropriations of $10,000 for the operation of an efficient snag boat, and for the maintenance of the contraction and shore-protection works.

Several lines of steamboats now make regular trips with but few detentions, and do a large passenger and freight business, between Columbus, Ga., and Apalachicola, Fla., and Bainbridge, Ga., on the Flint River. A large section of prosperous and well-settled country is entirely dependent upon the river for the transportation of its products and supplies.

For the above reasons $100,000 can be profitably expended in ensuing fiscal year.

COMMERCE.

Thirty-nine thousand eight hundred and fifty-six tons of freight, valued at $1,615,494.54, was carried by 6 steamers navigating this river.

The river and harbor act of July 13, 1892, contained this provision:

Improving Chattahoochee River, Georgia and Alabama: Continuing improvement, $25,000, of which $5,000 are to be used on that portion of the river between West Point and Franklin.

This section of 38 miles of the river consists of a series of pools varying in length from one-half to 5 or 6 miles, separated by rock shoals and rapids, in some of which the fall is as great as 8 feet to the mile. In the pools the width of the river is from 300 to 500 feet, with a channel nowhere less than 4 feet deep. At the shoals the river is much wider, with numerous islands, and low-water depths in many places of only a few inches. The bottom is generally of rock, and the banks are stable. There are few, if any, sand or gravel bars and but few snags.

The amount expended up to June 30, 1893, was $3,016.50.

The estimated cost of the improvement was $364,340.43, to be expended in constructing 6 dams and locks. The division engineer reports that he does not consider this part of the river worthy of improvement, and the available funds should be used in giving such relief to navigation as can be rendered by removal of rocks, bars, and snags, where such work is necessary.

In accordance with the above the balance of the appropriation of $5,000 will be expended during the season of 1893 in continuing rock excavation in the shoals above West Point. The balance available will probably complete the improvement of Flat Rock, Robert, and Haynes shoals, which will carry the work to the foot of Potts Shoals, about 6 or 7 miles above West Point.

As before stated, a useful navigation can be secured through these shoals only by the construction of locks and dams. It is probable, therefore, that by the end of the present working season the improvement will have been carried as far as can be usefully done under the approved method, and no estimate is submitted of the amount that can be profitably expended during the fiscal year ending June 30, 1895.

The commerce passing over this part of the river amounts to 4,873 tons.

FLINT RIVER, GEORGIA.

The river rises in the western part of Georgia, near the city of Atlanta. It flows past Montezuma, Albany, Newton, and other towns to Chattahoochee, Fla., where it unites with the Chattahoochee to form the Apalachicola River. The plan of improvement, made pursuant to an examination and survey of the river in 1872 and 1873, modified after further examination in 1879, contemplates a low-water navigable channel 3 feet in depth and 100 feet in width from the mouth of the river to Albany, Ga., a distance of 105 miles, and a navigable channel for light-draft steamers at a moderate stage of water from Albany to Montezuma, an estimated distance of 77 miles. The work to be done consists in the removal of snags and other obstructions from the channel and overhanging trees from the banks, the scouring of bars by works of contraction, and cutting of the prescribed channel through the rock reefs.

Prior to the beginning of Government operations there was practically no navigation of this river above Bainbridge, Ga., and the channel

over this portion was narrow, crooked, and much obstructed by logs, snags, and overhanging trees.

The expenditure up to June 30, 1892, was $170,301.58.

Above Albany the channel had been partially cleared of logs and snags and overhanging trees and, to a limited extent, of loose rock.

Below Albany the river had been kept in good navigable condition between Bainbridge and the mouth by the annual removal of snags and drift brought in by the winter freshets. Between Albany and Bainbridge a practicable low-water channel had been completed through the rock shoals for a distance of 22 miles below Albany. Between this point and Bainbridge a partial improvement had been effected, which enabled boats to run at moderate stages of water.

During the fiscal year ending June 30, 1893, $10,121.60 was expended in the care and preservation of plant, in the providing of motive power for the snag boat, and in continuing work under the approved project.

Between the mouth of the river and Bainbridge, Ga., an estimated distance of 36 miles, the river is in fairly good condition and requires little more than the annual clearing out of snags and drift brought in by the winter freshets.

Between Bainbridge and Albany, Ga., an estimated distance of 69 miles, the improvement consists mainly in excavating a channel through the many rock shoal and reefs and in depositing the excavated material in spur dams. The improvement, when completed, will be of a permanent character, but for its preservation and for the annual removal of the snags and drift it will be necessary to maintain a snag boat on the river, at an estimated cost of $6,000.

The improvement of the river above Albany will be very expensive, and as the commerce is not now such as would demand improvement it is recommended that no further allotments be made for the present for improvement above Albany, but that the whole appropriation be expended below Albany.

Amount that can be profitably expended below Albany in ensuing fiscal year, $38,000.

COMMERCE.

Between the mouth and Bainbridge many steamboats plying on the Chattahoochee and Apalachicola rivers make regular trips and do a large business, and the maintenance of the navigation is, therefore, of great commercial benefit.

Between Bainbridge and Albany a large river trade has been developed in consequence of the improvements already effected. The business will probably be much increased as low-water navigation is facilitated by further work.

OCMULGEE RIVER, GEORGIA.

The Ocmulgee River is formed by the confluence of the South and Yellow rivers, about 20 miles below Covington, and flows thence in a southeasterly direction about 350 miles, where it unites with the Oconee to form the Altamaha. Before the advent of railroads, steamboats plied regularly between Macon and the coast when the river was at good boating stage, i. e., about 7 feet above extreme low water. When the stage of water was too low for steamboat navigation, pole boats were used.

Prior to improvement navigation was much impeded by rock shoals, sand bars, overhanging trees, snags, and sunken logs, the low-water depth at some places not exceeding 2 feet.

From 1876 up to 1889 appropriations aggregating $79,500 were made for the improvement of this river, and the work was of much benefit to navigation.

A new survey of the river was required by the act of 1888.

The plan of improvement under which operations have been carried on upon the Ocmulgee River during the last fiscal year was adopted in 1890. The project contemplates the establishment of a steamboat channel 3 feet in depth at ordinary summer low water between Macon and the mouth of the river. This is to be obtained by removing rock shoals and sand bars, closing incipient cut-offs and revetting caving banks, removing snags and logs from the channel and overhanging trees from the banks of the stream.

The amount appropriated under the present project is $55,000. Of this amount $43,782.35 has been expended, with the following results: The channel has been cleared of obstructions from the mouth to Macon, and is now in good navigable condition. The spur dams at Tilmons Bar are in good condition, and the channel now has a depth of 4.7 feet across the bar. As a result of this improvement the Macon and Brunswick Steamboat Company has been organized at Macon, and is now running a boat from Macon to local points below; and when the freighting season arrives the company proposes to place a line of boats from Macon to Brunswick and Darien, Ga. A new line is also to be placed between Hawkinsville and Abbeville, Ga.

The sum of $50,000 can be economically and advantageously expended during the coming year. No permanent improvement can be effected, as new obstructions, caused by logs and snags, form during every high-water season. They should, however, become fewer in number each year. From $1,000 to $5,000 will be required for the annual maintenance of the completed work.

The amount (estimated) required to complete the existing project, $155,000.

COMMERCE.

During 1892 and 1893 5 steamers plied this river, carrying 23,500 tons of freight, valued at $935,250. In addition to this it is estimated that there are annually rafted over the river 50,960,000 feet, or 91,000 tons of timber, valued at $362,880. The total annual commerce of the river is therefore 110,293 tons, valued at $1,356,915.

It is impossible to make an accurate estimate of the increased commerce that will follow the proposed improvement. But, from the facts that new boats are to be added to the Lumber City and Hawkinsville lines, that citizens of Macon await the opening of the river to establish a line of steamers to the coast, that more frequent trips can be made and larger cargoes carried, and that a new region between Hawkinsville and Macon will become tributary to the river, it is not an extravagant estimate to say that the commerce of the river may be increased 100 per cent of its present value.

Freight rates by rail have been reduced $1 on the 1,000 pounds since last year.

OCONEE RIVER, GEORGIA.

The Oconee River is about 300 miles in length and drains an area of about 5,400 square miles, of which about 2,790 lie above Milledgeville. It rises near Gainesville and flows in a southeasterly direction, joining the Ocmulgee to form the Altamaha.

The northern portion of the valley contains some of the best farming land in the State of Georgia; and, while the southern portion is a good farming country, it contains large quantities of valuable pine timber. From Milledgeville down the river bottom itself, a strip of from 2 to 4 miles wide, has large quantities of oak, maple, elm, gum, and cypress, all of which will be valuable some time in the future.

In 1878 the first appropriation for improving this river was made by Congress, and the original estimate of cost of securing a 3-foot low-water channel was $15,000. This was found to be totally inadequate, and in 1880 the amount was increased to $50,000, and in 1888 to $100,000.

The act of 1888 provided for a new survey of this river.

The plan of improvement adopted in 1890 provides for the establishment of a navigable steamboat channel 3 feet deep at ordinary summer low water from Milledgeville to the river's mouth. This is to be accomplished by removing rafts, rock shoals, and sand bars, enlarging portions of the river, revetting caving banks and closing incipient cut-offs, removing snags and logs from the channel and overhanging trees from the banks of the stream.

The cost of the improvement is estimated at $171,000.

The amount appropriated under the new project is $50,000; the amount expended up to June 30, 1893, was $33,264.15.

The channel from the Central Railroad bridge to 11½ miles above it has been cleared of obstructions and is in good navigable condition. The shore protection at Old Boat Yard has been damaged by freshets; the spur dams of this place are in good condition, the work of the past year consisted mainly in snagging.

The sum of $50,000 can be economically and advantageously expended during the coming year. No permanent improvement can be effected, as new obstructions, caused by logs and snags, form during every high-water season. They should, however, become fewer in number each year. From $1,000 to $5,000 will be required for the annual maintenance of the completed work.

The amount (estimated) required to complete existing project, $121,000.

COMMERCE.

The river is navigable at high water from its mouth to Milledgeville, 147 miles. Six boats ply this river, carrying 23,500 tons freight, valued at $935,250.

In addition to the freights carried by the steamers, it is estimated that there are annually drifted down the river 40,320,000 feet or 72,000 tons of timber, valued at $362,880.

The total annual commerce of this river is therefore 95,517 tons, valued at $1,298,130. Freight rates have been reduced 50 per cent since the work of improving the river began in 1878.

SAVANNAH RIVER, GEORGIA, BETWEEN SAVANNAH AND AUGUSTA.

The Savannah River is formed by the junction of the Tugaloo and Keowee and flows in a southeasterly direction to the sea. Its channel length from this junction to its mouth is about 450 miles, while the distance in a direct line is only 250 miles. It drains, with its tributaries, an area of about 8,200 square miles. The country bordering the upper part of the river is hilly and generally cultivated up to the river banks; that bordering the lower part is low and swampy, the banks on either side for miles being overflowed during every freshet season.

The work thus far done by the Government has enabled the boats plying between Augusta and Savannah to carry goods at a reduced cost of at least 20 per cent in freight on merchandise and one-eighth cent per pound on cotton.

The total amount expended to June 30, 1889, was $78,603.73, and resulted in improving the condition of the shoals near Augusta and in removing the most dangerous obstructions to navigation throughout the whole extent of the river, no accidents to steamboats having occurred since these obstructions were removed.

The act of 1888 provided for a new survey of this river.

The plan of improvement adopted provides for the establishment of a navigable steamboat channel 5 feet deep at ordinary summer low water between the cities of Augusta and Savannah.

This is to be accomplished by removing sand and gravel bars, regulating portions of the river, revetting caving banks and closing incipient cut-offs, removing snags and logs from the channel and overhanging trees from the banks of the stream. The cost of the improvement is estimated at $332,000; $60,000 has been appropriated under the new project, and $35,000 has been expended.

The depth of water along the city wharves at Augusta is ample. The spur dams at Gardner Bar, opposite the city, are now in good condition, the breaks in them having been repaired during the past year and their crests raised to a uniform height of about 2 feet about summer low water. The spurs designed to protect the river bank below the city of Augusta are in good condition and have thus far accomplished their purpose. All of the dams at Course Bar and Sand Bar Ferry are now in good condition, and the depth of water on the shoals is about 6 feet. At the Port Royal and Augusta Railway Bridge the main current and best channel pass to the left of the draw opening, thus rendering it difficult for boats to pass through, since their approach is at an angle with the direction of the current.

All snags, logs, and overhanging trees obstructing the river between Savannah and Augusta have been removed by the snag boat *Toccoa* during the year, and the channel is now in very good condition.

The amount (estimated) required to complete the improvement, $272,000; amount that can be profitably expended in ensuing fiscal year, $75,000.

COMMERCE.

The improvement of the river has been accompanied by steady increase in the volume of river traffic (especially in manufactured cotton goods from Augusta, as through freight for exportation) and by a decrease in the rates of freight, both of which are more than commensurate with the expenditures involved. In fact, the annual commerce

has increased at the rate of $10 for every dollar expended by the United States, and freight rates have been reduced about 20 per cent.

The exports from the river bottom are mainly cotton, naval stores, lumber, and wool, while the imports are fertilizers, camp and mill supplies, cotton ties and bagging, and manufactured articles. Two steamers are engaged in the river traffic, carrying annually about 30,000 tons of freight, valued at $2,875,009. The falling off in the tonnage of the river carried by steamers is due to the decrease in supply of naval stores. In addition to the freights carried by the various steamers, the river valley affords logs, hewn and sawed timber, spars, and cord wood. The timber is rafted down the river. A large portion of the cord wood is lightered to Savannah, while the remainder is used as fuel by the river boats. The hard wood sawed and the shingles split along the river are shipped to Savannah by boat. It is estimated that about 37,600 tons of logs, timber, and cord wood, valued at about $153,480, are annually rafted or lightered to Savannah and other places along the river. This makes the total annual shipments of the Savannah River 67,477 tons, valued at $3,028,489.

SAVANNAH RIVER ABOVE AUGUSTA, GA.

Above the city of Augusta the river is navigable only by pole boats. The obstacles are numerous and extensive. They consist of rocky ledges, isolated bowlders, and bars of sand and gravel with minimum low-water depths of less than 1 foot.

The project for the improvement of this river was adopted in 1879, the object being to secure a low-water pole-boat channel, 30 feet in width and 3 feet in depth, between Augusta and Trotters Shoals, 64 miles above. The cost of the improvement, which was not based upon accurate surveys, was estimated at $45,000. No work has been done upon this river since August, 1883.

A survey of the river was made in October, 1889. A report thereon was submitted January 31, 1890, together with a project for the improvement of the river below Petersburg, with a view to obtaining a channel 12 to 25 feet in width for boats drawing 2 feet of water. The cost was estimated at $33,000.

The total amount expended is $49,000; $10,000 has been spent under the new project, and has resulted in improving the medium stage channel through a few of the rock ledges and in removing some of the most dangerous bowlders obstructing navigation.

The river banks are in good condition from The Locks, above Augusta, Ga., to Petersburg, Ga.

The channel is in good and navigable condition from The Locks, above Augusta, Ga., to Little River Shoals, 17¼ miles above.

Amount (estimated) required for completion of existing project, $23,000; amount that can be profitably expended in fiscal year ending June 30, 1895, $23,000.

COMMERCE.

The freight carried on the river consists principally of cotton, grain, fertilizers, and general merchandise. Its total value amounted last year to about $350,000, the freight receipts upon which amounted to about $30,000. With an improved pole-boat channel the commerce of the river could be considerably increased, but no work other than that necessary for the benefit of pole-boat navigation is needed.

JEKYL CREEK, GEORGIA.

Jekyl Creek forms part of the inside passage between Savannah River, Georgia, and St. Johns River, Florida. It connects St. Simon Sound and Brunswick River at the north with Jekyl and St. Andrew sounds at the south. The creek is about 5 miles in length, is separated from the Atlantic Ocean by Jekyl Island, and debouches into Brunswick River about 6 miles from the town of Brunswick, Ga.

With the exception of two points, the creek has ample widths and depths to accommodate the largest class of vessels that take the inside route. About a mile from its northern end a shoal is found between the points where Lathram and Mud rivers enter the creek, and from the mouth of the creek to the deep waters of Brunswick River, in the bight formed by the southern shore of the latter, there is an extensive mud flat. The least mean low-water depth across at the mouth of the creek was 3.7 feet. Across the shoal between Lathram and Mud rivers it was 3 feet.

The project adopted in 1888 contemplates the establishment of a navigable channel through the creek 7 feet deep at mean low water.

The estimated cost of the improvement is $38,590.

The following comprise the main features of the plan of improvement:

A training wall at the mouth of the creek, designed to guide and concentrate the ebb currents across the mud flats to the deep waters of Brunswick River; closing Mud River by means of a dam at some suitable point, to prevent the escape of water through that branch at ebb tide; dredging through the mud flats at the mouth of Jekyl Creek and in the creek proper, near the mouth of the river.

The training wall is in good condition; a narrow 6-foot channel follows the direction of the training wall to its outer end; thence over the shoal the least depth is 5½ feet. The 5-foot curve is continuous over the shoal.

The total expenditures to June 30, 1893, were $19,811.08.

The irregular and inadequate appropriations heretofore made for this improvement have so increased its cost that the original estimate of cost must be increased by more than $16,000.

It is estimated that the sum of $18,590 is necessary to complete this improvement. This amount can be economically and advantageously expended during the coming fiscal year. Unless the full amount is made available, the cost of the work will be still further increased.

COMMERCE.

The commercial value of the annual traffic through Jekyl Creek is estimated at about $1,000,000, and the amount of freight carried at about 30,000 tons.

COOSA RIVER, GEORGIA AND ALABAMA, BETWEEN ROME, GA., AND THE EAST TENNESSEE, VIRGINIA AND GEORGIA RAILROAD BRIDGE IN ALABAMA.

The Conasauga and Coosawattee rivers rise in northwestern Georgia, and by their junction, about 4 miles above Resaca, Ga., form the Oostenaula, which then flows to the southwest until it is joined by the Etowah, about 4 miles above Rome, Ga., forming the Coosa River. The Coosa River thence has a general direction west by south to near

Gadsden, Ala., where it turns to the southward. Eleven miles below Wetumpka, and 18 miles above Montgomery, the Coosa and Tallapoosa meet and form the Alabama River, which 312 miles lower is joined by the Tombigbee, and then becomes the Mobile River, which empties into Mobile Bay at Mobile, 44½ miles below.

The Coosa River presents the cheapest and most certain water route to the Gulf of Mexico of the coal, iron, cotton, and cereals of a vast extent of country.

The removal of the obstructions, which cut in half this river, now navigable for hundreds of miles below and above such obstructions, is a national duty, in view of the commerce it would pour into the Gulf of Mexico. The opening of the Coosa will enable the Government to move munitions of war from the interior to the seaboard safely and expeditiously; it will place the navigable waters of the Coosa so close to the navigable waters of the Tennessee that water communication between the two streams must certainly follow, and thus afford the Tennessee River and its vast tributaries an outlet to the Gulf by way of the Bay of Mobile.

By means of the Upper Coosa, the Oostenaula, and Coosawattee rivers there is now a stretch of 293 miles of navigable river above Lock No. 4, and by means of the Coosa and Alabama rivers a stretch of 367 miles of easily navigable river below Wetumpka. The improvement of the 116 miles of river between Lock No. 4 and Wetumpka will therefore afford a continuous route of water transportation, 776 miles in length, from northwestern Georgia, through the mineral region of north Alabama, to the Gulf of Mexico, at Mobile, Ala.

Pursuant to various examinations and surveys made between 1870 and 1878, a plan of improvement was originally adopted which contemplated the removal of the lesser rock shoals and sand and gravel by excavation and by works of contraction, so as to give a minimum depth of 3 feet at low water in the channel, and the construction of locks and dams to overcome the more serious obstructions below Greensport. The project as approved was limited to the section of river between Rome, Ga., and the East Tennessee, Virginia and Georgia Railroad bridge, a distance of about 236 miles.

The expenditure up to June 30, 1892, of $667,844.23 had resulted in securing a fairly navigable channel from Rome to Greensport by blasting out the rock shoals and by the construction of wing dams to scour out the sand bars.

Below Greensport, at distances, respectively, of 0.68, 3.86, and 5.24 miles, three masonary locks, each having an available width of 40 feet and length of 175 feet, with their accessory dams, had been completed and opened to navigation. In consequence of the improvement steamboats made regular trips between Rome and Gadsden, and, when business demanded it, extended their trips to a landing 1 mile below Lock No. 3.

At the site of Lock No. 4, 21 miles below Lock No. 3, the permanent dam and abutment had been nearly completed and the cofferdam partly built, making navigation practicable on a moderate rise to this point.

During the year ending June 30, 1893, the sum of $85,563.21 has been expended in channel work on the shoals and reefs between locks Nos. 3 and 4; on the cofferdam for the lock, and in stopping leaks through the rock foundation in the same; in quarrying and cutting stone for Lock No. 4, and transporting it from the quarry to the site of the lock; in the coping of the west abutment of the dam and inshore

protection below it; in completing and repairing Dam No. 4; and in the purchase of plant, including the stern-wheel towboat.

In the improved portions, during about nine months of the year, there is 5 feet or more of water in the shoal places, and for the remaining three months there is ordinarily 3 feet. The river is never closed by ice.

Amount (estimated) required to complete existing project, $960,133. Amount that can be profitably expended in ensuing fiscal year, $600,000.

COMMERCE.

Articles.	Quantity.	Tons.
Cotton.....bales..	18,000	4,400
Cotton seed.....sacks..	16,000	800
Fertilizers.....do....	17,000	1,700
Hides and skins.....packages..	200	11
Live stock.....head..	150	60
Lumber.....feet..	7,000,000	17,000
Rafted timber and logs.....do....	8,000,000	18,000
Staves.....pieces..	2,500,000	2,100
Provisions.....packages..	28,000	1,700
Grain.....sacks..	60,000	3,200
Miscellaneous freight.....packages..	50,000	6,500
Total.....	.....	55,471

Estimated value of above freights (in round numbers), $1,480,000.

COOSA RIVER, BETWEEN WETUMPKA AND THE EAST TENNESSEE, VIRGINIA AND GEORGIA RAILROAD BRIDGE.

The act of September 19, 1890, appropriated $150,000 for the improvement of this portion of the river, with the proviso that such improvement "be made in harmony with the existing approved project for the improvement of the Coosa River between Rome and said bridge, locks to be 40 feet wide and 210 feet between miter sills."

The last river and harbor act repealed the clause as to size of locks.

The main object of this improvement is to provide cheap transportation for the coal and iron deposits of the Coosa Valley to the Gulf of Mexico. The coal and iron ore will be carried in barges towed by steamboats.

To June 30, 1892, the sum of $45,263.94 was expended in procuring the necessary outfit and in making detailed surveys for the precise location of the locks near Wetumpka and in making a series of velocity and discharge observations, extending from high to low water; in filling up and grading the yard at the site of Lock No. 31 and building thereon workshops, etc.; in the purchase of machinery and plant for the construction of the cofferdam and Lock No. 31; in excavating rock from the channel of the river above Wetumpka Bridge, and in building a breakwater to divert the current from the lock site.

During the year ending June 30, 1893, the sum of $62,937.51 has been expended.

The land at the site of Lock No. 31 has been procured by condemnation proceedings; the lock-keeper's house, to be used during the construction as an office and quarters, has been built; the rock excavation from the channel above the Wetumpka Bridge has been continued, the soft rock has been deposited as a protection to the caving bank, and the hard rock has been broken up for use in making concrete; a dredge

and machinery for pumping sand from the river bed have been procured, and a large quantity of sand has been pumped up and stored for use in making concrete; 380 linear feet of cofferdam has been built. The construction of the cofferdam has been attended with unusual difficulty on account of the depth of water in which it is necessary to build it and on account of the succession of floods, caused by the excessive rainfall extending throughout the year.

Amount (estimated) required for completion of existing project, $4,843,074; amount that can be profitably expended in ensuing fiscal year, $600,000.

INSIDE WATER ROUTE BETWEEN SAVANNAH, GA., AND FERNANDINA, FLA.

The river and harbor act of 1890 authorized a survey of this waterway "with a view of obtaining a steamboat channel of 7 feet depth at mean low water," and in the report thereon it is recommended as worthy of improvement.

This is to be accomplished by the improvement of Romerly Marsh, Mud River, Little Mud River, and Jekyl Creek by means of dredging and the construction of closure dams and training walls of brush mattresses loaded with riprap stone. The estimated cost of the improvement is $105,000.

Throughout the greater portion of the route are found ample widths and depths for steamboat navigation. Depths less than 7 feet at mean low water are found at the following places: Romerly Marsh, Mud River, Little Mud River, Jekyl Creek, The Dividings. In Frederica Creek, abont 1 mile above Frederica Landing, the channel is obstructed by oyster beds. Some slight shoaling has also taken place at the mouth of Adams Creek.

At two of the localities, viz, Romerly Marsh and Jekyl Creek, work has already been done by the United States. There is now a mean low-water depth at the former place of 4.8 feet and at the latter of 5.5 feet. At Mud River there is for nearly 4 miles a mean low-water depth of only about 4 feet. Near the southern end of Little Mud River there is a shoal with a depth of about 6 feet at mean low water. At "The Dividings," near the mouth of Crooked River, there is a depth of about 5.5 feet at mean low water.

Fifteen thousand dollars was appropriated by the last river and harbor act; this has been spent entirely on the improvement at Jekyl Creek. The depth across the bar at that place is now 5½ feet, against 4.08 feet before improvement.

The amount required to complete the improvement, $90,000; all of this can be expended to advantage in fiscal year ending June 30, 1895.

COMMERCE.

The inside route is of great value to the coasting trade between Savannah and Fernandina and the intermediate points. A regular line of steamers plies the entire route, making semiweekly trips. Another line is established between Savannah and Darien, making three trips per week. A small steamer makes daily round trips between Brunswick and Darien, and on the Cumberland route a daily round-trip schedule is maintained between Brunswick and Fernandina, connecting at Brunswick with the Brunswick and Western and the East Tennessee, Virginia and Georgia railways. There are also a number of small

freight steamers making irregular but frequent trips between the Ogeechee, Altamaha, and Satilla rivers, and the ports of Savannah, Darien, and Brunswick. Other small steamers are engaged in the oyster and fishing business, and ply between the numerous oyster beds and fishing grounds along the inside route and the several coast cities. A large fleet of sloops and schooners of from 25 to 50 tons burden bring oysters, fish, rice, and shells from points along the inside route to the cities, and a number of barges, towed by tugboats, are used in transporting the products of the sea and of coast plantations to the city markets. Large vessels are often towed from port to port without cargo or ballast by the inside route, when it would be impossible for them to reach the desired port by sea without taking in ballast; and partially loaded vessels often take the inside route to another port to complete their cargoes, thus avoiding rough weather at sea. About 25,000,000 feet of lumber are annually rafted and towed from the mouth of the Altamaha River to Sapelo Sound and St. Simon Sound for shipment in deep-draft vessels to foreign ports.

The total traffic during the year ending June 30, 1892, was approximately as follows:

Number of trips	4,900
Tons of freight carried	156,000
Value of freight	$2,787,000
Number of passengers	41,000

The improvement of the shoals which now obstruct navigation on the inside route would render possible a much better passenger and freight service than is now maintained. The boats of the regular lines would then be able to run on schedule time, and not be compelled to wait for a suitable stage of tide for crossing the shoals. The boats of the Cumberland route carry the United States mails as well as passengers and freight, and are so run as to connect with the Florida Central and Peninsular Railway at Fernandina and the Brunswick and Western and the East Tennessee, Virginia and Georgia railways at Brunswick.

APALACHICOLA RIVER, FLORIDA.

The Apalachicola River is formed by the junction of the Chattahoochee and Flint rivers, and is about 105 miles long from the junction to Apalachicola Bay. The channel is nowhere less than 6 feet deep, but is more or less obstructed after each freshet in the Chattahoochee and Flint rivers by logs and snags brought down by those rivers and by trees which have fallen from its own heavily timbered banks.

At Moccasin Slough and at the Upper and Lower Elbows the channel is very narrow and crooked and difficult to navigate and needs straightening and widening.

The original project for the improvement of the river provided for securing a channel, 100 feet wide and 6 feet deep, by the removal of snags and overhanging trees and widening and straightening the channel at Moccasin Slough and the Elbows at an estimated cost of $80,333.

In conformity with the act of September 19, 1890, this project was in that year modified by adding thereto the securing of a channel, 60 feet wide and 5 feet deep, through the Cut-off, Lee Slough, and the Lower Chipola River at an estimated cost of $7,500.

The expenditure between 1874 and June 30, 1892, of $44,565.90 had resulted in clearing out the great accumulation of logs and snags and

overhanging trees which originally obstructed the Apalachicola River, and in annually removing the new logs and snags brought in by the winter freshets.

A partial improvement had also been effected at Moccasin Slough and the Elbows, but navigation was still difficult at these points.

During the fiscal year ending June 30, 1893, the sum of $5,000 has been expended in removing snags, sunken logs, and overhanging trees from the Apalachicola River, the Cut-off, and Lower Chipola River, and in opening a practicable but narrow and crooked channel through Lee Slough. Steamboats can now, with some difficulty, pass through the Cut-off, Lee Slough, and Lower Chipola River on the upstream passage. These waterways afforded the only practicable means of transportation for the products of this section of country, which is being rapidly settled by fruit-growers, and it is very desirable that a sufficient appropriation shall be made to enable a safe channel to be opened through Lee Slough.

The Cut-off is a navigable waterway, about 3 miles long, connecting the Apalachicola River with the Lower Chipola River near the Dead Lakes. The Chipola River empties into the Apalachicola River about 14 miles below its junction with the Cut-off. "Lee Slough" is simply a local name for a portion of the Lower Chipola River, about 3 miles long (see map at page 1697 of the Annual Report of the Chief of Engineers for 1881). It is, therefore, suggested that the wording of the next appropriation for this river be changed from "Apalachicola River, including Lee Slough," to "Apalachicola River, including the Cut-off and Lower Chipola River," in order that the work required to be done may be correctly designated.

The amount (estimated) required to complete the improvement, $11,000. This entire amount should be appropriated in fiscal year ending June 30, 1895.

COMMERCE.

It is not possible to state the amount of business done on the Apalachicola River separately from that done on the Chattahoochee River, but in general terms it may be stated that it is the same.

Reference is therefore made to the report on the Chattahoochee River for commercial statistics.

CALOOSAHATCHEE RIVER, FLORIDA.

The Caloosahatchee River rises in the region west of Lake Okeechobe and flows westward into San Carlos Bay. Owing to the absence of any railway the inhabitants of the Caloosahatchee Valley are entirely dependent upon water carriage for the transportation of all heavy freight and bulky articles. The tributary country is being settled rapidly, many fine fruit and vegetable farms being found on the banks or near the river. Fine cattle ranges are located along the upper river.

Prior to the commencement of operations by the United States the lower portion of the river was so obstructed by oyster bars that the available channel depth was only 5½ feet. Some 17 miles above its mouth the river loses the characteristic of an estuary, and there exist numerous islands and a broad shoal.

The project adopted in 1882 called for the formation, by dredging, of a channel 100 feet wide and 7 feet deep from the bay to Fort Myers, a distance of 14 miles. In 1886 this project was modified so as to include

the improvement of the upper rivers as far as Fort Thompson by removal of snags and overhanging trees.

Up to June 30, 1892, $27,577.41 had been expended on the improvement. A channel 6 feet deep and 100 feet wide existed between the mouth and Fort Myers. A narrow cut 5 feet deep had been made through the shoals at Beautiful Islands and partially protected by a training wall, and the worst obstructions had been removed from the river as far as Fort Thompson.

When work stopped there was a clear channel from the mouth to Fort Thompson, having a mean low-water depth of 6 feet as far as Fort Myers, and a depth of 4 feet for the remaining distance. An annual expenditure of $1,000 will be required to maintain this improvement.

The act of July 13, 1892, appropriated $1,000 for this work, which sum is still held available for maintaining the channel, and will be expended in removing fallen trees and a small shoal near Beautiful Island as soon as the services of the snag boat are available.

The amount required for maintenance in fiscal year ending June 30, 1895, is $1,000.

COMMERCE.

In the year 1892 6 steamers and 34 sailing vessels carried 22,400 tons of freight, valued at $658,515, and 1,500 passengers.

CHOCTAWHATCHEE RIVER, FLORIDA AND ALABAMA.

The Choctawhatchee River rises in the southeastern part of Alabama and flows in a southerly and southwesterly direction past the towns of Newton, Geneva, and Caryville, emptying into Choctawhatchee Bay, which Santa Rosa Sound connects with Pensacola Harbor.

The river flows through a rich agricultural country, in a region which contributes a large proportion of the lumber transported from Pensacola.

When work on the improvement was commenced in 1874 the river, although having an average width of 300 feet, was almost totally obstructed, only admitting narrow barges and flats of light draft to be navigated, and the channel—if a channel existed at all—was such as to be exceedingly dangerous to navigation, particularly during low-water stages.

The project for improvement adopted in 1880 contemplated the improvement of the river to obtain a low-water navigable channel from its mouth to Geneva, Ala., an estimated distance of 125 miles, and a navigable high-water channel from Geneva to Newton, Ala., an estimated distance of 37 miles.

In 1890 the project was amended to provide for securing a low-water channel from Geneva to Newton.

The improvement consists in the removal of logs and snags from the channel and overhanging trees from the banks, in deepening sand bars by works of contraction and shore protection, and in excavating a channel through the rock and marl shoals.

The expenditure up to June 30, 1892, of $104,178.28 had resulted in sufficiently removing the obstructions from the river between its mouth and Caryville to meet the requirements of the present commerce on that section of the river and in giving a fairly navigable channel, except at extreme low water, from the crossing of the Pensacola and

Atlantic Railroad, at Caryville, Fla., to Geneva, Ala., a distance of 25 miles, and a partially improved channel from Geneva to Pate Landing, 25 miles above.

Steamboats now run with considerable regularity from Geneva, Ala., to the railroad at Caryville.

During the year ending June 30, 1893, $7,582.66 was expended in snagging operations between Geneva and Caryville, in providing plant for carrying on the works of contraction and shore protection at the troublesome bars, and in work of this character at Buzzard Bar, Gumfield Shoals, and Busby Shoals.

Geneva is a thriving town, the trading and shipping center for a rich agricultural region surrounding it. The river affords the only practicable means of transportation to this district. During recent years the work has, therefore, mainly been directed to improving this section of the river, and has resulted in clearing out a large number of the accumulated logs and snags. Low-water navigation is impeded by several sand bars, which can be readily deepened by works of contraction and shore protection if sufficient funds are appropriated for the purpose.

Since the completion of the Alabama Midland Railroad from Montgomery, Ala., to Bainbridge, Ga., which passes through Newton, the urgent necessity for improving the upper portion of the river no longer exists, and it is doubtful if this section of the river would now be much used, even if the improvements were completed.

The plan, therefore, contemplates completing the improvement between Geneva and Caryville, and then between Geneva and Pate Landing, before beginning any work upon the marl shoals which now obstruct navigation between Newton and Pate Landing. It is very doubtful whether a safe low-water navigation of this section of the river can be secured except by the construction of locks and dams, to provide slack-water navigation, at a cost not warranted by any prospective commerce to be developed thereby.

The sum of $30,000 can be advantageously expended in fiscal year ending June 30, 1895.

COMMERCE.

Two steamers plied this river in 1892, carrying 11,406 tons of freight, valued at $1,065,800; besides the above, the lumber trade on the river amounted to $800,000.

ESCAMBIA AND CONECUH RIVERS, FLORIDA.

Under the name of the Conecuh River this stream rises in the southeastern part of Alabama and flows past the towns of Andalusia, Brewton, and Pollard to the Florida State line, where its name is changed to Escambia River, and the stream continues southward to Pensacola Bay.

The river originally was much obstructed by snags, sunken logs, and rock shoals, and by a very shoal bar at the mouth. Steamboat navigation was not attempted, and rafts had much difficulty in passing down the river.

The plan of improvement for this river, adopted pursuant to examinations and surveys made in 1878 and 1879, contemplates the removal of snags, sunken logs, and other obstructions from the channel, cutting through rock shoals and deepening sand bars, by works of contraction and shore protection, from the mouth of the river, in Pensacola Bay, to

the mouth of Indian Creek, an estimated distance of 293 miles, for the purpose of facilitating the movement of timber down the river, affording at the same time facilities for steamboat navigation.

The amount expended up to June 30, 1892, $63,996.63 had resulted in providing, maintaining, and renewing the necessary plant; in twice dredging the channel through the bar at the mouth of the river to permit the passage of tugboats drawing 5 feet of water; in the removal of a large number of the accumulated logs and snags from its mouth to Jordan Shoals, a distance of 136 miles, and in keeping the improved channel fairly free from logs and snags brought in by the winter freshets. There was then a fairly navigable channel from the mouth of the river to Jordan Shoals, a distance of 136 miles, for stages of water 2½ feet above low water.

During the fiscal year ending June 30, 1893, $7,982.17 was expended in providing the snagboat with its own motive power by the addition of a stern-wheel, with a boiler and engines for running it, and in snagging operations at various points along the river where the greatest trouble was experienced in navigation.

This river and its tributaries pass through the extensive timber lands of south Alabama and Florida, and the value of the lumber annually taken to market by the river is estimated at over $1,800,000.

In order that the business may be carried on safely and profitably the river should be kept free from snags and like obstructions by an efficient snagboat; and a channel 100 feet wide and 8½ feet deep should be dredged through the bar at the mouth of the river, in order that the large tugs employed in towing the rafts to Pensacola may cross the bar and enter the river for the purpose of reaching the rafts. The rafts are now floated across the bar and fastened to timber stands in the open bay, where they are exposed to sudden storms, and a large annual loss in money and lumber is thus occasioned.

The cost of dredging the bar at the mouth of the river is estimated at $12,000. The annual cost of operating the snagboat is estimated at $6,000, or $12,000 for two years.

The above amount, $24,000, can be advantageously expended in fiscal year ending June 30, 1895.

The present commerce of this stream is confined to the rafting of timber and logs. Not less than 60 per cent of the lumber exported from the port of Pensacola passes out of this river, the estimated valuation of which is $1,800,000. No accurate records of the timber business on the river are obtainable, and more detailed statistics can not be furnished.

MANATEE RIVER, FLORIDA.

Manatee River rises in the southern part of Florida and flows in a westerly direction, emptying into Tampa Bay on its southern shore. For a distance of 12 miles from its mouth it has the characteristics of an estuary. For 10 miles the settlements along its banks are almost continuous.

The portion under improvement is the lowest reach, between Rocky Bluff and the mouth, a distance of about 12 miles. This had a mid-channel depth of from 7 to 20 feet. The general width is about three-fourths of a mile. At the mouth was a long shoal with a minimum depth of 7 feet. Between Palmetto and Manatee, about 6 miles from the mouth, was another bar covered by from 3 to 5 feet of water.

The project adopted in 1882 had for its object to form a channel 100 feet wide and 13 feet deep at mean low water from Tampa Bay to McNeil

Point (Palma Sola). Owing to the changed commercial conditions since the adoption of the project, brought about by the extension of the railroad to Tampa, the transfer to Tampa of the principal gulf steamship lines, and the service of the smaller towns around Tampa Bay by coasting steamers from Tampa, the project was modified in 1886 to provide for the passage of these lighter draft vessels to all of the towns of the lower river by the removal of the bar above Palmetto.

Up to the close of the fiscal year ending June 30, 1892, $27,978.13 had been expended on this improvement. A dredged cut was made across the bar at the mouth of the river, another cut was made across the bar between Manatee and Braidentown, and a survey and map of the river were made. The cut at the mouth had been nearly obliterated, but a channel 8 feet deep and of sufficient width existed from Tampa Bay to Manatee. By the act approved September 19, 1890, $6,000 was appropriated for continuing the improvement, which amount was supplemented by a further appropriation of $6,000, made by the act approved July 13, 1892. With the $12,000 thus available extensive repairs were made to the Uuited States steam snag and dredge boat *Suwanee*, with a view of better adapting it to this work. It is proposed to dredge a channel 12 feet deep at mean low water, and 100 feet wide, through the bulkhead at Sneads Point. Work was begun in June, 1893. One thousand three hundred and eighty-nine cubic yards was removed.

The amount (estimated) required to complete the project, $33,000; the amount that can be profitably expended in fiscal year ending June 30, 1895, $15,000.

COMMERCE.

Two steamers plying this river carried 20,951 tons freight, valued at $816,326 during the year 1892.

SUWANEE RIVER, FLORIDA.

The Suwanee River rises in the southern part of Georgia, near Okefinokee Swamp, and, flowing in a general southerly direction, empties into the Gulf of Mexico a few miles north of Cedar Keys. The length of river under improvement is 130 miles. From the Derrick Gap entrance to Branford, a distance of 80 miles the width of the river varies from 250 to 300 feet, and its original low-water depth from 3 to 30 feet. It was but little obstructed excepting at the mouth. Between Branford and Ellaville the general width is 325 feet. It was obstructed by many dangerous rock shoals, crossed by crooked channels which had a low-water depth of from 1.5 to 3 feet, as well as by snags and overhanging trees.

The project for improvement, adopted in 1880, contemplates the formation of a channel 150 feet wide and 5 feet deep from the gulf (through the bars at the passes) as far up the river as New Branford (Roland Bluff). From there to Ellaville the channel is to be 60 feet wide and 4 feet deep.

Up to the close of the fiscal year ending June 30, 1892, $40,761.67 had been expended on this improvement. A long cut, now partly obliterated, had been made through the shoals between the mouth and deep water of the Gulf of Mexico, and a practicable but not safe channel had been opened as far as Hudson.

The channel between Branford and Luraville has been widened and deepened so that a channel, safe during medium and high stages and fairly safe and 3 feet deep at the lowest stages, now exists as far as Hudson, 15 miles below Ellaville. The channel across the Suwanee basin was partially opened and was marked with palmetto piles.

No work has been done during the past year other than repairing the snagboat.

The Suwanee River commerce renders it unnecessary to extend the cuts previously made through the Suwanee Basin to the deep water of the gulf, and restricts the work under the project, which the present commercial status renders necessary, to the clearing of the river channel proper and the dredging of the oyster bars from the Derrick Island Pass at the mouth.

The amount (estimated) required to complete project $21,158; amount that can be advantageously expended in ensuing fiscal year, $10,000.

COMMERCE.

The amount of freight for 1892 was 34,461 tons, valued at $1,579,100. About 30 per cent of the traffic is carried by water.

VOLUSIA BAR, FLORIDA.

Volusia Bar is situated at the head of Lake George, and is formed by materials brought down by the St. Johns River and deposited at the point where the current of the narrow river loses its velocity as the bed widens to form the lake. The usual depth on the bar before operations began was from $3\frac{1}{2}$ to $4\frac{1}{2}$ feet, with a very crooked channel. At times this depth was diminished so much as to stop navigation entirely.

The adopted plan of improvement was to contract the waters on the bar by the construction of two converging jetties formed of brush and stone, with a view to causing a scour to the depth of 5 feet. Should the depth caused by the jetties not be sufficient, recourse was to be had to dredging. Between the jetties on the bar lines of guide piles were placed to keep vessels off the jetties and to define the channel clearly.

Up to June 30, 1892, $25,889.91 had been expended. The jetties had been built to their full length and to a height sufficient to produce the desired effect. Two lines of firmly set fender piles defined the jetty channel on the crest of the bar, and a straight channel with a minimum low-water depth of 5 feet had been obtained. In the spring of 1890 the crests of both jetties were found to have lowered slightly, and several gaps had been made through them, to a depth of 4 feet in one place. One hundred and ninety-seven cubic yards of rock was placed on the jetties, filling the lowest places.

Under the last appropriation of $1,000 the break in the row of fender piles has been repaired.

Commerce has been greatly hampered by boats grounding on the bar. Further improvement of the bar is required. Only temporary relief can be obtained by an extension of the jetties. The best and surest method to adopt will be to deepen the channel by dredging from time to time as may be needed.

From past experience it would seem that the annual deposit on the bar is about 500 cubic yards. If there were any plant available, this could be removed with an annual expenditure of $500.

Amount required for annual maintenance, $1,000.

COMMERCE.

Four steamboats were engaged in the commerce of Volusia Bar in the year 1892, carrying 15,318 tons of freight, worth $783,646; 10,000 passengers were carried.

OCKLAWAHA RIVER, FLORIDA.

The Ocklawaha River rises in the central part of the State of Florida, having its source in Lake Apopka. It flows for some 200 miles in a generally northwestward direction and empties into St. Johns River about 25 miles above Palatka. The only navigable stream tributary to the Ocklawaha is the Silver Spring Run, 9 miles long and navigable at all seasons of the year.

The entire river is exceedingly crooked and very narrow, the average width varying from 22 feet to 150 feet. The portion which it is proposed to improve lies between Leesburg, on Lake Griffin, and the mouth, a distance of 94 miles. The channel width varies from 30 to 70 feet, and the depth from 5 to 9 feet. From the outlet of Lake Griffin, for a distance of 28 miles, the river is sluggish in current and is badly obstructed by floating islands and grass. For the remaining 58 miles the current is strong, and the principal obstructions are snags and overhanging trees. An appropriation of $10,000 was made in the act approved September 19, 1890, for improving the river.

The approved project is to clear the channel by removing the snags and the worst overhanging trees and by moving the floating islands out of the channel and staking them in place by piles.

The amount expended on this improvement up to the close of the fiscal year ending June 30, 1892, was $8,775.69.

Under the appropriation made by act of September 19, 1890, a survey and map of the river were made and the channel was cleared of its worst obstructions from the mouth to the prairie, a distance of 60 miles. A total of 3,881 snags and 705 overhanging trees was removed, and 84 trees were trimmed.

The unprecedented low water developed a few shoals which it appears desirable to have removed, and more effective means being proposed for keeping the channel clear of floating islands. In view of the fact that the railroads are practically inaccessible to a large number of the residents of this portion of the river, and that the improvement of the river as far as Leesburg would enable the orange and vegetable growers in the vicinity of Lake Griffin to ship their produce by water to the St. Johns River, a project for continuing the improvement to Lake Griffin was submitted, and approved October 14, 1892, increasing the estimated cost of the improvement $15,000, making the total cost (estimated) of the improvement $26,000, of which amount $11,000 has been appropriated.

Amount (estimated) required to complete existing project, $15,000; this amount can be expended advantageously in ensuing fiscal year.

COMMERCE.

In the year 1892, 5 steamers carried 58,975 tons of freight, valued at $2,009,142, and 6,400 passengers. Fifty per cent of the trade of the neighborhood is carried by water.

SARASOTA BAY, FLORIDA.

Sarasota Bay is a tidal estuary on the west coast of Florida, extending from the lower end of Tampa Bay to Caseys Pass, a distance of about 34 miles. It is separated from the Gulf of Mexico by a chain of narrow keys, varying in width from 300 feet to 1 mile. The upper portion, from Tampa Bay to the "Mangroves," is called Big Sarasota Bay, and the lower portion, between the "Mangroves" and Caseys Pass, is known as Little Sarasota Bay. There are five navigable entrances to the bay, one from Tampa Bay and four from the Gulf of Mexico.

Sarasota Bay is bordered by lands well suited for raising fruits and vegetables. The country roads are few and poor. The nearest railroads are at Port Tampa and St. Petersburg, on the north side of Tampa Bay, where are also steamship lines to gulf ports and Cuba.

The products of this country include palmetto, agave, and banana fibers, honey, sugar, sirup, oranges, lemons, limes, bananas, pineapples, vegetables, lumber, fish, oysters, and cattle. Owing to the absence of regular and economical facilities for transportation, but few of these products are exported. Trade is limited to the actual necessities of the population.

A navigable channel, with a minimum depth of 5 feet, extends throughout the length of Big Sarasota Bay excepting in two reaches, Palma Sola Pass and Long Bar, which have a total length of 5,400 feet. In these reaches the available depth was 4.3 and 3.5 feet, respectively. The tidal range in the bay is 1.5 feet.

The approved project calls for the formation of a continuous channel 100 feet wide and 5 feet deep at mean low water from Tampa Bay to the town of Sarasota, Fla., a distance of 21¼ miles.

The $2,500 appropriated by act of July 13, 1892, was expended in repairing the U. S. steam snag and dredge boat *Suwanee* and concontinuing the work at Palma Sola Point, resulting in connecting the 5-foot contours by a cut 2,292 feet long, with a width of from 38 to 40 feet and a depth of from 5 to 6 feet. A further examination of the shoal at Long Bar revealed peculiar difficulties in its removal, and a revised project was approved September 23, 1892, calling for an additional $7,500 for the completion of the improvement.

Amount (estimated) required to complete project, $10,000; this amount can be profitably expended in ensuing fiscal year.

COMMERCE.

During the year 1892 the freight carried was 9,041½ tons, worth $240,550. Ninety per cent of the trade of the neighborhood is carried by water. Increase of trade, were improvement completed, 500 per cent.

WITHLACOOCHEE RIVER, FLORIDA.

This river is 120 miles long and has a normal width varying from 75 to 180 feet, though at numerous points a defined channel is almost lost in broad, marshy lakes and cypress swamps. The low-water depth varied from 1 to 7½ feet. Before improvement the river was so obstructed by shoals, loose rocks, snags, fallen trees, floating grass islands, and bars as to be practically impassable excepting in isolated reaches.

The river was examined with a view to its improvement in 1879. The approved project calls for the removal of snags, overhanging trees,

loose rocks, and some of the worst shoals between the Gulf of Mexico and Pemberton Ferry, a distance of about 77 miles, so as to permit boats of 2-feet draft to navigate the river during one-half the year.

Prior to June 30, 1891, the river had been cleared and made navigable, as called for by the project, between Pemberton Ferry and Dunnellon. Work was still required on some of the ledges in order to make navigation safe. Work was also required below Dunnellon.

The amount expended up to June 30, 1892, was $21,049.26.

In the act approved September 19, 1890, $5,400 was appropriated for continuing the improvement. Work under this appropriation was begun March 23, 1892. On account of the very low stage of the river the United States snag and dredge boat *Suwanee* could not be taken up where the work was most required. The boat was laid up and a party formed from the crew, and the work of removing obstructions was carried on from the small boats and from the banks.

During the last fiscal year operations were continued until the money available was exhausted. The channel is now practically clear from Pemberton Ferry to the mouth.

The amount (estimated) for maintenance during the year ending 1895, $800.

COMMERCIAL STATISTICS.

Commerce of Withlacoochee River, Florida, for the year ending December 31, 1892.

Articles.	Gross tonnage.	Estimated value.	Articles.	Gross tonnage.	Estimated value.
Fertilizers	800	$28,000	Merchandise	2,017	$100,850
Fruits	1,630	63,378	Vegetables	250	8,500
Grain	950	23,000	Phosphate	75,000	450,000
Hides	2	100			
Honey, sirup, etc	15	1,250	Total	105,664	690,078
Logs	25,000	15,000			

Vessels.	Character.	Tonnage.
Sam Pyles	Stern-wheel steamer	62.31

ALABAMA RIVER, ALABAMA.

The Alabama is formed by the junction of the Coosa and Tallapoosa rivers, 18 miles above Montgomery, Ala., in the central portion of the State, and flows southward past the town of Selma, uniting with the Tombigbee to form the Mobile River, which empties into Mobile Bay. This river, with its principal tributary, the Coosa, now under improvement, offers a continuous line of water transportation from Rome, Ga., to the Gulf of Mexico, flowing through the coal and iron deposits of Alabama and the cotton belt.

Before improvements were begun in 1878 the river was so full of sunken logs and snags and so obstructed by bars, shoals, and reefs, on many of which the low-water depth was only $2\frac{1}{2}$ to $3\frac{1}{2}$ feet, that navigation was both difficult and dangerous, and many boats were destroyed. At low-water stages boats could only run by daylight, and long detentions at the bars and shoals were frequent. The normal width of the upper river is from 500 to 600 feet, and of the lower river from 700 to 800 feet. In the portions of the river having these widths

the low-water depths vary from 8 to 15 feet, but where the river had been widened by the erosion of its banks, bars, shoals, and reefs are found. That portion below the cut-off, 20 miles in length, was absolutely inaccessible during low water, and all landings situated thereupon were deprived of steamboat service during that season.

The project, adopted in 1876, provided for obtaining a channel 200 feet in width and 4 feet in depth at low water from the mouth of the river, 44 miles above Mobile, to Wetumpka, Ala., a distance of 323 miles, by the removal of snags, logs, etc., from the channel, cutting overhanging trees from the banks, removing rock and gravel reefs by blasting and dredging, and deepening sand bars by works of contraction and shore-protection.

In 1892 the present plan of improvements was adopted, which provides for obtaining a low-water channel 6 feet deep from Wetumpka, Ala., to the junction with the Tombigbee River, 44 miles above Mobile, Ala., an estimated distance of 323 miles, by the removal of logs and snags from the channel and overhanging trees from the banks, by the removal of rock reefs and gravel bars by blasting and dredging, and deepening sand bars by works of contraction and shore protection, at an estimated cost (prior to the appropriation of July 13, 1892, of $70,000) of $386,251, exclusive of the cost of maintenance and snagging, estimated at $10,000 per annum.

The expenditure of $177,985.78 up to June 30, 1892, had resulted in clearing the river of dangerous snags and logs and overhanging trees, in maintaining an efficient stern-wheel snag boat for the removal of the logs and snags brought in by the winter freshets, in the improvement of eight of the worst bars by works of contraction, which, however, had not been maintained on account of inadequate appropriations and then needed extensive repairs, in opening the 20 miles of river below the cut-off, in an increased safety to navigation, greater regularity and reduction in time of trips, and in enabling boats to carry greater loads. Boats now run by night as well as by day at all stages of water.

During the year ending June 30, 1893, $38,272.39 was expended in snagging operations, in procuring plant for contraction and shore protection works, in building training dams, and in protecting the shores at Three Chutes Bar, Hadnot Bar, Manack Island, and at Silver Creek Shoals. The effect of the training dams built has been very satisfactory, and has resulted in deepening the channels at those bars, which were serious impediments to low-water navigation.

The amount (estimated) required to complete the present object, $336,251; amount that can be expended in ensuing fiscal year, $150,000.

COMMERCE.

Articles.	Quantity.	Tons.	Articles.	Quantity.	Tons.
Cotton .....bales..	48,574	12,129	Provisions ....packages..	121,496	10,278
Cotton seed.....sacks..	92,232	4,611	Grain.....sacks..	75,993	6,340
Fertilizers .....do....	61,574	2,759	Miscellaneous freight,		
Hides and skins.packages..	811	202	.....packages..	141,741	21,979
Live stock .....head..	700	297			
Lumber .....feet..	134,000	284	Total weight.....	.....	62,581
Staves .....pieces..	218,496	3,702			

In addition to the commerce carried on by the above boats, the rafting business on the river is very large. Great quantities of sawed and hewed timber and logs are rafted annually, but no available records of this business are kept.

The commerce has doubled since 1884.

BLACK WARRIOR RIVER, ALABAMA, FROM TUSCALOOSA TO DANIELS CREEK.

This river rises in the northern part of Alabama and runs southwestward, entering the Tombigbee River about 1 mile above Demopolis. It is nearly 300 miles long.

The present project for the improvement of this section of the river was adopted in 1886, the object being to afford a waterway for the transportation of coal, iron ore, iron, etc,, in barges from the Warrior coal fields to the Gulf of Mexico by the construction of five locks and dams, at an estimated cost of $741,670.

The present channel is only navigable at very high water, and is even then extremely dangerous.

The appropriations from 1884 to date, aggregate, $556,250.

The amount expended to June 30, 1892, was $324,454.92, resulting as follows:

Lock No. 1: Complete as to masonry, with south bank sloped, paved, and turfed. Lock-tender's house built; dam filled to 9 feet below crest.

Lock No. 2: North wall of lock built and one-third of bank wall.

Lock No. 3: Cofferdam built and 356 yards of ashlar quarried.

The amount expended during the fiscal year ending June 30, 1893, is $79,979.97, and the condition of the work June 30, 1893, was as follows:

Lock No. 1: Masonry of lock and abutment completed; lock-tender's house built; lock yard paved and both banks sloped and paved, nearly; timber and stone filling for dam on hand; needle dam ready to put in.

Lock No. 2: Lock masonry completed; south bank sloped, paved, and turfed; rock filling for dam on hand, 378 yards; grading done for abutment, 3,091 yards; lumber for needle dam on hand and partly framed; face stone and coping for abutment in readiness.

Lock No. 3: Lock chamber excavated; masonry commenced; 2,579 yards of cut stone on hand; 1,750 yards of backing on hand; 932 yards earth excavated for bank wall; 2,321 yards sand for mortar hauled.

The importance of this work can scarcely be overestimated in view of the enormous quantity of coal in the country through which this river flows, its excellent quality, and accessibility. It is believed that the completion of the improvement will effect a reduction of freight rates of not less than $50,000 annually on the present business of the Warrior Valley, and that it will open up a vast business in the transportation of coal to the Gulf. The present freight on coal by rail from the Warrior Valley to Mobile is $2.10 a ton. It is asserted that this will be reduced fully $1.25, so that coal can be sold at Mobile as low as $2.50 a ton. The city of New Orleans now consumes 363,000 tons of Pittsburg coke and 59,000 tons of Alabama coal, a total of 422,000 tons, which now costs the consumer fully $1,700,000. With the Black Warrior and the lower rivers improved as at present contemplated this amount can be delivered for less than $1,000,000.

Amount estimated required to complete the existing project, $185,420, all of which can be advantageously expended in ensuing fiscal year.

TOMBIGBEE AND WARRIOR RIVERS, ALABAMA.

a. Warrior River.—The main water route from the Gulf of Mexico up into the interior of Mississippi and Alabama is by way of Mobile Bay, the channel in which is now being deepened to 23 feet up to the city of Mobile, where the ocean and river craft meet, up the Mobile River, which now has a least depth of 13 feet, and can be given a depth

of 30 feet to the junction of the Alabama and Tombigbee, a distance of about 47 miles; thence up the Tombigbee a distance of 191 miles to the junction of the Tombigbee and Warrior rivers near Demopolis; thence up the Warrior River into Alabama 132 miles to Tuscaloosa, and from there up into the mineral field above Tuscaloosa, or by the Tombigbee River into Mississippi from Demopolis up to Vienna, where the Sipsey joins, a distance of 91 miles; thence up the same stream to Columbus, a distance of 65 miles; thence up to the head of navigation.

Work under a project to obtain a channel with a minimum depth of 4 feet and a minimum width of 80 feet was in progress from 1875 to 1888, and was intended for the relief of the commerce of that time, the transportation of cotton and plantation supplies. The reduction in freight charges due to competition between river and rail has been estimated at about $50,000 per annum on the present business.

In 1889 work was commenced on a system of locks and dams in the river above Tuscaloosa for the development of a new kind of commerce, the transportation of coal, requiring a greater depth (6 feet) and width of channel.

This compels a change in the project for the lower river.

With an improved water route from the Warrior coal fields to the Gulf of Mexico, having a minimum channel depth of 6 feet, the coal transportation by it should soon reach an amount that the annual saving to the consumers on account of the reduction in cost from present prices, due to the cheap river freight and competition with railroad, would equal the sum required for the improvement.

The present project for the improvement of this river was adopted in 1890, the object being to obtain a channel 6 feet deep at ordinary low water from Tuscaloosa to its mouth by the removal of logs, snags, and overhanging trees, the improvement of bars, bank revetment, and the construction of locks and dams, at an estimated cost of $577,000. The channel at this time is not navigable at a low-water stage.

The amount expended up to the close of the fiscal year ending June 30, 1892, was $48,671.86 in preparations of plant and the removal of snags, logs, and overhanging trees, no increased depth being obtained.

The amount expended during the fiscal year ending June 30, 1893, was $16,294.82 in the removal of snags, logs, slip-ins, and overhanging trees, and resulted in considerably reducing the time required to run the river and the hazard attending at.

The amount (estimated) required to complete the present project, $457,000; amount that can be profitably expended in ensuing fiscal year, $250,000.

COMMERCE.

The amount of freight carried over the Warrior River in 1892, was 3,933 tons, consisting chiefly of cotton.

b. Tombigbee River up to Demopolis.—Survey of this portion of the river was directed by the act of August 11, 1888. The present project for the improvement was adopted in 1890, the object being to secure a channel of 6 feet depth at low water by removal of logs, snags, and bank revetment, and construction of locks and dams, at an estimated cost of $508,898. At the present time the channel has a minimum depth of 2 feet.

The amount appropriated for this project up to date is $180,000.

The amount expended prior to June 30, 1892, was $48,187.85, and resulted in the removal of logs, snags, trees, etc., from the river for

140 miles, in the repair of jetties at Osage and Barneys shoals, and the partial removal by blasting of rock shoals at Woods Bluff and McGrews and Pearsons shoals.

The amount expended during the fiscal year ending June 30, 1893, was $20,595.29, and resulted in the removal of logs, snags, trees, etc., from the portion of the river not worked over in the preceding two years and the working over again of 37 miles.

Work of other character was almost completely pervented by the long continuance of high water.

The river is now navigable as far as Demopolis throughout the year for the class of boats now in operation upon it, but to keep it in this condition will require an annual appropriation of $10,000 for the preservation of the improvement; this should be made separately from the appropriation for the work proper. No further permanent improvement can be obtained until the completion of the system of locks and dams included in the existing project.

The amount required to complete the existing project, $328,808; this entire amount can be profitably expended in ensuing fiscal year.

COMMERCE.

The amount of freight carried over this part of the river in 1893 was 74,542 tons.

c. Tombigbee River from Fulton to Columbus, Miss.—The channel before improvement was not navigable at all, except during high water, and navigation was practicably suspended when the river reached 12 feet above low water.

The project for the improvement of this section of the river, from Fulton to Columbus, 144 miles, was adopted in 1873, the object being to give a good high-water channel for navigation throughout by the removal of snags, logs, and overhanging trees and was completed.

The sum of $6,000 was appropriated by act of July 13, 1892. The amount expended in fiscal year 1893 was $3,193.47, in the removal of snags, logs, and overhanging trees.

There is now a clear high-water channel from Fulton down to Wilson Landing, a distance of 65 miles, enabling rafts of logs and timber of much larger size than formerly to be floated down with perfect safety at a stage 5 feet above low water.

Owing to caving banks and shifting of the channel the improvements made are not permanent. It is estimated that an annual expenditure of $5,000 will be required to maintain the river in the condition contemplated by the plan of improvement.

Amount required for preservation of improvement, $10,000; this amount can be profitably expended in ensuing fiscal year.

COMMERCIAL STATISTICS.

Downstream.

Articles.	Quantity.	Value.
Cypress logs.....tons..	286	$1,716
Ash logs.....do...	200	2,000
Poplar logs.....do...	242	3,636
Oak logs.....do...	300	600
Pine logs.....do...	5,000	40,000
Total.....	6,028	47,952

TOMBIGBEE RIVER FROM DEMOPOLIS, ALA., TO COLUMBUS, MISS.

This part of the stream was embraced in the recent survey of the Warrior and Tombigbee rivers, and a new project for an increased depth recommended for reasons similar to those given in the report on the Tombigbee and Warrior rivers.

The present project was adopted in 1890, the object being to obtain a channel of 6 feet depth at ordinary low water by removal of logs, snags, etc., bank revetment, and construction of locks and dams, at an estimated cost of $779,400.

The present channel has a minimum depth of 1 foot.

The length of this portion of the stream is 156 miles.

The sum of $50,000 has been appropriated for this project.

The amount expended prior to June 30, 1892, was $15,000, and resulted in the preparation of a working plant and the clearing of 22½ miles below Windham of snags, logs, trees, etc., and a similar improvement at Ten Mile Shoals.

The amount expended during the fiscal year ending June 30, 1893, was $10,575.28, and resulted in clearing 125 miles of the river, from Pickensville to Demopolis, of snags, logs, trees, etc.

An annual appropriation of $10,000 will be required for the preservation of this improvement of the river, and should be made separately from the appropriations for the work proper.

The amount (estimated) required to complete the existing project, $729,400; amount that can be profitably expended in ensuing fiscal year, $250,000.

COMMERCIAL STATISTICS.

Articles.	1893.	1892.	Articles.	1893.	1892.
Cotton ..... tons..	2,000	3,000	General merchandise..tons..	5,622	7,291
Grain ..... do...	2,221	2,916			
Iron ..... do...	29	29	Total	15,822	19,069
Lumber ..... do...	5,950	5,833			

TOMBIGBEE RIVER, MISSISSIPPI—WALKERS BRIDGE TO FULTON.

The present project for the improvement of this section of the river was adopted in 1888, the object being to obtain a good channel for navgation during high water by the removal of snags, logs, stumps, and cutting overhanging trees, at an estimated cost of $11,000.

The channel was originally only navigable for small rafts and very troublesome for them.

The amount expended up to the close of the fiscal year ending June 30, 1892, was $7,591.11 and resulted in completion of the project.

The amount expended during the fiscal year ending June 30, 1893, was $2,279.48, and resulted in the removal of the annual accumulation of snags, logs, and trees, in preservation of the improvement.

The results obtained by this improvement are as follows:

Rafts of timber of much larger size than before can be floated downstream safely on a 3-foot rise above low water, and barges drawing 4 feet water can be carried down safely on a 5-foot rise above low water.

An annual expenditure of $2,500 will be required to maintain the river in the condition contemplated by the plan of improvement.

COMMERCIAL STATISTICS.

Downstream.

Articles.	1892.	1893.
	Tons.	*Tons.*
Lumber and logs	11,880	8,250
Staves	32	28
Firewood	756	.....
Total	12,668	8,278

BIG SUNFLOWER RIVER, MISSISSIPPI.

This river has its source in Mud Lake, Coahoma County, Miss., flows in a southerly direction, and enters Yazoo River about 45 miles above its mouth. During extreme high water it is navigable to Clarksdale, 280 miles above the mouth, but Faisonia, 144 miles above the mouth, ordinarily is considered the head of navigation.

The project contemplated building wing dams to scour a channel from 3 feet to 40 inches deep at the bars, and the removal of snags, sunken logs, and leaning timber obstructing navigation. The cost was estimated at $66,000, if the work should be completed in three or four consecutive seasons.

The total amount appropriated for this work is $62,000.

The amount expended to June 30, 1892, was $56,935.11. Operations during the fourteen years extended over the navigable part of the river from Clarksdale to the mouth, though little has been done above Faisonia since 1882, for the reason that it would have resulted in no benefit to commerce or navigation to clear the upper river and allow the lower portion to remain obstructed, the amounts appropriated at irregular intervals having been too small to permit work over the whole river. To obtain the greatest benefit with the means available it has been the endeavor to keep the lower river open the year round and to extend navigation higher as the work progresses. Steamboat men report that before the improvement commenced the river was navigable for very light boats about six months of the year; now it is navigable to Woodburn the year round, but difficult and dangerous at low stages on account of shoals, snags, and sunken logs. Larger boats are used and make the round trip from Vicksburg (about 180 miles and return) in five days, while before the improvement it was unusual for a boat to make the trip under eight days. Freight rates are reported to be 50 per cent less. The lands along the river are being cleared and settled rapidly of late years, which is attributed in part to the improved navigation.

As new obstructions are added from time to time, it is impracticable to give a definite estimate for permanent improvement, but an appropriation of $20,000 can be expended profitably in one season of low water for improving and extending navigation of this stream, and will result in greater benefit and work of a more lasting character than can be obtained with a larger sum in small allotments at intermittent periods.

COMMERCE.

In the year 1893 this river was navigable to Woodburn, about 80 miles above the mouth, the entire time, and during medium and high stages boats ran into the upper river to Faisonia and Burch Place.

Ten steamers plying on this river carried 43,299 tons of freight, valued at $893,000.

NOXUBEE RIVER, MISSISSIPPI.

This river rises in Choctaw County, Miss., runs southeastwardly into Alabama, and enters the Tombigbee River near Gainesville.

Before the present improvement was commenced navigation, except by small flatboats, was practically impossible, the river having been virtually abandoned for navigation since the building of the Mobile and Ohio Railroad in 1859. The chief obstructions consisted in an immense number of trees overhanging the river throughout its entire length. The minimum depth of the river at ordinary low water was from $1\frac{1}{2}$ to 2 feet.

The present project for the improvement of this river was adopted in 1880, the object being to afford a channel for small river steamers from its mouth up to Macon, Miss., of navigable width and depth when the water is above ordinary low-water stage.

The amount expended up to the close of the fiscal year ending June 30, 1892, was $49,899.29, and resulted in completion of the project. The amount expended during the fiscal year ending June 30, 1893, $3,067.12, was for repair and alteration of steamer and care and preservation of public property.

The river during high water is navigable from its mouth to Macon. This work will require an annual expenditure of $3,000 to maintain it in its improved condition, and no further improvement should be considered until the Tombigbee River below Gainesville is completely improved.

The reduction in freight charges on cotton and produce by railroad due to the improvement of the river is estimated at not less, and probably much more, than $20,000 per annum.

The amount (estimated) for maintenance, $3,000. This amount can be profitably expended in ensuing fiscal year.

PASCAGOULA RIVER, MISSISSIPPI.

This river is formed by the Chickashawha and Leaf rivers, which unite in the southern part of Greene County. It runs southward through Jackson County into the Gulf of Mexico at Pascagoula Bay.

Before improvement the channel over the bar had a least depth of 3 feet. This was increased to $7\frac{1}{2}$ feet with a width of 180 feet by dredging, from 1878 to 1880, at a cost of about $42,500. From the light-house near the mouth of the river to its head there is a navigable channel, obtained by the removal of snags and overhanging trees from 1881 to 1884, inclusive, at a cost of about $15,000.

The present project for the improvement of this river was adopted in 1886, the object being to afford a channel of navigable width and minimum depth of 12 feet at mean low water from Moss Point down to the anchorage in the sound, and to maintain the river above Moss Point in its improved condition, at an estimated cost of $78,100 for the channel from Moss Point down, and $2,500 annually for preservation of improvement above Moss Point.

The amount expended to June 30, 1892, was 77,141.46 and resulted in the completion of more than one-third of the work needed to complete the project from Moss Point down to the anchorage in the sound.

The officer in charge reports that it has been necessary to increase the estimate for completion of this work owing to the hardness of a portion of the material to be dredged.

The amount expended during the fiscal year ending June 30, 1893, was $20,954.49 and resulted in the removal of 99,977 cubic yards of material from the lower reach of the dredged channel south of the bar below the mouth of Pascagoula River.

The condition of this river on June 30, 1893, is such as to allow boats of 4 feet draft of water, to navigate safely on a low stage of river from Moss Point to Carters Landing, 55 miles.

Amount (estimated) required for completion of existing project, $49,000. Amount (estimated) required for preservation of improvement above Moss Point, $20,000. Amount that can be profitably expended in fiscal year ending June 30, 1895, $69,000.

COMMERCIAL STATISTICS.

Description.	Entries.						Clearances.					
	1893.			1892.			1893.			1892.		
	No.	Tons.	Crew.	No.	Tons.	Crew.	No.	Tons.	Crew.	No.	Tons.	Crew.
Foreign	249	130,104	3,735	....	104,076	.....	245	120,099	3,675	....	110,887	.....
Coastwise	28	11,200	224	....	31,451	.....	73	29,200	584	....	35,115	.....
American	104	20,800	624	....	.....	.....	106	21,200	636	....	.....	.....
Total	381	162,104	4,583	....	135,527	.....	424	170,499	4,895	....	146,002	.....

Articles.	Tons.	Value.
Logs and square timber	159,917	$958,800
Resin	1,400	15,000
Turpentine	300	24,000
Total	161,414	997,800
Upstream:		
General merchandise	2,500	.....

PEARL RIVER, BETWEEN EDINBURG AND CARTHAGE, MISS.

The project for the improvement of this portion of the river was adopted in 1884, the object being to obtain a good high-water channel, at an estimated cost of $13,464. Before the improvement was commenced navigation was only possible during very high water, and was even then troublesome. The amount expended up to the close of the fiscal year ending June 30, 1890, was $5,857.08, and resulted in the completion of the project.

The amount expended on this work up to June 30, 1892, was $12,375.70

The condition of this part of the river on June 30, 1892, was such as to allow light-draft boats to navigate with comparative safety from Edinburg to Carthage on a 4½ foot rise above ordinary low water.

The amount expended during the fiscal year ending June 30, 1893, was $2,351.89, and resulted in an increased width of 10 feet and an increased depth of 1 foot.

The project is completed.

Before improvement most of the freight had to be hauled by wagons between Edinburg and railroad stations, generally a distance of from 30 to 60 miles. The freight on a barrel of flour from New Orleans to Edinburg was, before improvement, $2.10. Now it is 50 cents. It is estimated that an annual saving of at least $30,000 in freights and insurance will result from the improvement.

Owing to caving banks and shifting of the channel, the improvements so far made are not permanent, and it is estimated that an annual expenditure of $500 will be required to maintain the river in the condition contemplated by the plan of improvement.

One steamboat carried in 1893 820 tons freight, valued at $105,000. This is a large increase over that of 1883, when improvement was begun.

PEARL RIVER, MISSISSIPPI, BETWEEN JACKSON AND CARTHAGE.

The present project for the improvement of this portion of the river was adopted in 1887, the object being to obtain a channel of 2 feet depth at low water, and of navigable width throughout, at an estimated cost of $50,000.

Before the improvement was commenced navigation, even during high water, was difficult on account of snags and overhanging trees.

The amount expended on this work up to the close of the fiscal year ending June 30, 1892, was $26,067.38.

The condition of the improvement on June 30, 1892, was such as to allow light-draft boats to navigate safely on a 3-foot stage above low water from Jackson to Carthage.

The results obtained by the improvement of this section of the river during the fiscal year ending June 30, 1893, are an increased depth on account of removal of snags, sunken logs, and trees, and an increased width of at least 10 feet of the channel on account of trimming off points.

There is a large reduction and saving in freights and insurance rates.

An annual expenditure of $2,400 will be required to maintain the river in the condition contemplated by the plan of improvement.

COMMERCE.

The amount of freight carried over this portion of the river in 1893 was 3,323 tons, worth $181,776.

Before improvement most of the produce and merchandise had to be hauled between Carthage and other landings on the river to the nearest railroad station, a distance of 25 to 40 miles. The freight on a bale of cotton from Carthage to Jackson by railroad and wagon was, before improvement, $5; by boat down the river it is $2. The rate of insurance has also been considerably reduced.

PEARL RIVER, BELOW JACKSON, MISS.

The present project for the improvement of this portion of the river was adopted in 1885, the object being to afford a channel 2 feet deep at ordinary low water and of navigable width from the mouth of the river up to Jackson, at an estimated cost of $145,940. Before the improvement the river was not navigable at all at low water, and difficult at high water.

In addition to the improvement of the river proper, the increased lumber trade of the mills situated on the river demands the deepening of the channel over the bar at the mouth of East Pearl River to 12 feet, a rough estimate of the cost of which is $20,000.

The appropriations hitherto made aggregate $143,125.

Nearly one-half of the amount appropriated has been expended in the removal of the annual accumulation of snags, logs, etc., in preservation of the improvement.

Fifty-five and one-half miles from the mouth up were improved in accordance with the adopted project. Fifty and one-half miles of river, up to Wheats Fields, were improved for a 100-foot-wide channel, and fifty miles of river, from Wheats Fields to Columbia, Miss., have been partially improved. From Columbia to Jackson the river has been partially improved by contract. No other work has been done on that section since, and it remains in about the same condition.

The condition of this section of the river on June 30, 1893, is such as to allow light-draft boats to navigate from the mouth, at the Rigolets, Louisiana, to Wheat Fields, Mississippi, 106 miles, all the year; from Wheat Fields to Columbia, Miss., 50 miles, on a 6-foot rise, and from Columbia, Miss., to Jackson, Miss., 169 miles, on a 7-foot rise, and then it is dangerous.

The benefits that are derived by the improvements of this section of the river are greater security to navigation between New Orleans, La., and Columbia, Miss., and other towns and settlements situated on the river, and reduced rates of freights and insurance on merchandise and produce.

It is proposed to apply any appropriation that may be made for the fiscal year ending June 30, 1895, to continuing the improvement of the river for a 2-foot channel at low water between Columbia and Jackson, and in deepening the channel over the bar at the mouth of East Pearl river and in dredging a channel 12 feet deep.

Owing to caving banks and shifting of the channel the improvements so far made and contemplated are not permanent. An annual expenditure of $5,000 will be required to maintain the river in the condition contemplated by the plan of improvement.

Amount (estimated) required to complete existing project, $20,000. This amount can be profitably expended in ensuing fiscal year.

COMMERCE.

The value of the annual commerce on the river below Jackson increased in the seven years from 1885 to 1893, from $632,000 to $1,792,800.

The tonnage of the river was 202,173 tons.

TALLAHATCHEE RIVER, MISSISSIPPI.

The head waters of this river are in Tippah County, in northern Mississippi, whence it flows in a general southwesterly direction through the counties of Union, Lafayette, Panola, joins Coldwater River in Quitman, and then, as the main stream flows, in a southerly direction through Tallahatchee and Leflore counties, and unites with Yallabusha in forming Yazoo River.

The approved project, adopted in 1879, contemplated removing snags, sunken logs, and leaning timber, obstructing low-water navigation below the mouth of Coldwater River about 100 miles, and the removal of a wreck in the channel near the mouth. The estimated cost was $40,000 if completed in two seasons.

Previous to improvement the river was navigable from the mouth of the Coldwater to the Yazoo about six months of the year. Boats from the Yazoo now run to Sharkey Landing, 100 miles above the mouth, throughout the year.

The amount expended to June 30, 1892, was $37,481.48, of which $10,000 was required by law to be expended above the mouth of Cold-

water (a part of the river in which there has been no navigation since the war, and which was not included in the project). The work done resulted in great benefit to navigation below Sharkey Landing, a distance of about 65 miles, enabling steamboats to run to that place the year round, while before the improvement commenced there was navigation for only about six months of the year. Little work was done above Sharkey, because the funds were not sufficient and because until 1890 the steamboat interest reported that boats would not run above that landing except to make occasional trips at high stages, when navigation was as good and about as safe as in the lower river.

In the past fiscal year the snag boat *Meigs* was employed for seven weeks in removing obstructions to navigation. The river below Sharkey Landing was put in good navigable condition, after which operations were carried up to mouth of Coldwater River with considerable benefit to navigation of that stretch of river.

The sum of $5,000 appropriated by last river and harbor act has been expended below the mouth of Coldwater River.

The original estimates contemplated completing this work in two consecutive seasons at a cost of $40,000, but the total amount appropriated in fourteen years is only $42,500, of which the law required $10,000 to be expended in a part of the river not included in the project. New obstructions are added every year by sliding and caving banks, and the shifting and scouring of the channel exposes others or lodges them upon the bars. The sum of $10,000 can be expended profitably in one season of low water and result in permanent benefit to navigation.

COMMERCE.

In fiscal year 1892–'93 48,371 tons of freight, valued at $908,000, were carried over this river.

TCHULA LAKE, MISSISSIPPI.

Where the Yazoo River reaches the head of Honey Island, about 220 miles above its mouth, it divides into two branches, the westerly one retaining the name of the river, while the easterly or narrower branch is named Tchula Lake (or River). The distance from the head to the foot of the island, where the two branches again unite, is about 67 miles.

The country along the lake is highly cultivated, and very productive plantations join one another along its banks. The amount of cotton raised annually is estimated at about 20,000 bales, most of which, however, is transported by railroad, as it has to be marketed before navigation opens in the lake. The regular Yazoo and Tallahatchee steamboats make trips through the lake when the water is high enough.

An examination of Tchula Lake was made by the United States in 1879, and the principal obstructions to navigation were found to be snags and logs in the lower part and leaning timber and shore snags along both banks from the foot to the head of the island. The project contemplated removal of these obstructions to permit light-draft boats to enter the lake earlier in the season. The estimated cost was $10,000 if all the work should be done in one low-water season.

Appropriations aggregating $18,000 have been made, and the obstructions have been removed, as far as practicable with the amounts appropriated.

The amount expended to June 30, 1892, was $14,970.59, resulting in clearing the greater portion of the leaning timber from the banks and

in the removal of the main obstructions from the channel, giving greater ease and safety to the passage of steamboats through the lake; but the period of navigation was not prolonged, owing to the enlargement of the bars in the lake.

No work was done during the past fiscal year, but it is intended to resume the removal of obstructions to navigation as soon as the water falls to a low stage.

By the expenditure of $6,000 in one low-water season the obstructions can be removed so thoroughly as not to need further attention for years, and inexpensive brush or pile dams can be built at the bars to extend the period of navigation.

COMMERCE.

During fiscal year 1892–'93 6,078 tons of freight were carried through the lake. The value of this freight was $243,000.

YAZOO RIVER, MISSISSIPPI.

Yazoo River is formed by the junction of the Yallabusha and Tallahatchee rivers, in Leflore County, Miss. It flows in a southwesterly direction through a remarkably fertile section of country and enters the Mississippi 5 miles above Vicksburg.

The project adopted in 1873 contemplates removing snags, logs, wrecks, and leaning timber obstructing navigation throughout the entire length of the stream. New obstructions are brought into the river every year by floods, sliding banks, etc., and no estimates for permanent improvement have been made on this account.

The total amount appropriated to date is $235,000.

The total amount expended to June 30, 1892, was $211,919.43, part of which was applied to constructing the snag boat *Meigs*, the purchase of a pumping dredge, and to the survey of the mouth and lower river. Prior to improvement the river was obstructed by a large number of wrecks, snags, and leaning timber that limited the period of navigation. Nine of the steamboats sunk during the war of the rebellion were removed by contract in 1873–'74, and snag boats have operated since whenever funds were available, benefiting low-water navigation greatly and keeping the river in navigable condition from head to mouth the year round.

In the past fiscal year the snag boat *Meigs* was employed during the low-water season in removing obstructions from the channel and did effective work, putting the stream in good navigable condition, but, as new snags and tree slides are brought in by every high stage of water, operations will have to be continued for many years.

Work in Yazoo and tributary streams could be carried on more economically if they were grouped together as a system and appropriations made under one head, with allotments for each stream.

The amount that can be profitably expended in fiscal year ending June 30, 1895, $100,000.

LEAF RIVER, MISSISSIPPI.

This river is formed by the junction of the Upper Leaf and Bowie Creek, in Perry County, Miss. It flows in a southerly direction and joins with the Chickasahay to form the Pascagoula.

The act of August 11, 1888, provided for an examination of Leaf River from its mouth to mouth of Bowie Creek, near the New Orleans and North Eastern Railroad.

This examination was made and report submitted on February 15, 1889.

The approved project is to clear the channel from the mouth to the mouth of Bowie Creek for high-water navigation by the removal of snags, logs, and overhanging trees, at an estimated cost of $25,000.

The aggregate appropriations for this work are $10,000.

The amount expended during the fiscal year ending June 30, 1892, was $4,597.86, and resulted in giving a high-water channel from Hattiesburg to Augusta, Miss., a distance of 40 miles.

The amount expended during the fiscal year ending June 30, 1893, was $527.92, and resulted in giving a high-water channel from the mouth up to Doddrills Landing, a distance of 15 miles.

The amount (estimated) required to complete the existing project, $15,000; amount that can be profitably expended in ensuing fiscal year, $15,000.

COMMERCIAL STATISTICS.

Up and down stream.

Articles.	1893.		1892.	
	Tons.	Value.	Tons.	Value.
Logs and lumber	52,064	$355,400	162	$11,836.03
General merchandise	25	25,500	.....	.....
Total	52,089	357,900	162	11,836.03

CHICKASAHAY RIVER, MISSISSIPPI.

This river was examined in 1889 and reported to be worthy of improvement by the removal of logs, snags, and overhanging trees from the mouth, at the head of the Pascagoula River, up to the railroad bridge near Shubuta, a distance of 130 miles. This, it is estimated, will cost $30,000, and give 3 feet depth of channel at ordinary low water.

Ten thousand dollars have been appropriated for this work.

The amount expended during the fiscal year ending June 30, 1892, was $4,595.27, and resulted in giving a high-water channel that allows much larger rafts than formerly to be brought downstream with comparative ease.

The amount expended during the fiscal year ending June 30, 1893, was $1,851.19 and resulted in improving the high-water channel already obtained.

The saving to producers by improvement proposed is estimated at about $50,000 annually.

This improvement is not permanent, owing to caving banks and shifting of the channel. An annual expenditure of $2,000 will be required to maintain the river in the condition contemplated by the plan of improvement.

COMMERCE.

Downstream.

Articles.	1893.		1892.	
	Tons.	Value.	Tons.	Value.
Lumber and logs	6,894	$210,400.00	347	$38,197.69

This shows an increase in value of $172,202.31 over that of 1892.

MOUTH OF YAZOO RIVER, MISSISSIPPI.

The shifting bar at mouth of Yazoo River is the most serious obstruction to commerce, and boats that could navigate the principal streams of the Yazoo Valley system (about 800 miles) without hindrance are prevented at low stages from entering or leaving without lightering, and frequently navigation across the bar is closed altogether. The river and harbor act of 1890 directed a survey to determine in what manner the mouth could be improved to permit free passage of vessels at all seasons of the year, and to include an investigation of the feasibility and advantage of making a new outlet for the river with an estimate of cost.

A report of this survey was transmitted February 9, 1892. The improvement therein proposed contemplates the formation of a new outlet from the former mouth of Yazoo on Old River, through the deep water in Old River, across the low lands between Long and Barnett lakes to Lake Centennial, around the head of De Soto Island, along the front of Vicksburg, entering Mississippi River on the channel side at Kleinston. The cost of the work required was estimated at $1,500,000.

The river and harbor act of 1892 appropriated $75,000 for commencing work under the foregoing project, to be applied to obtaining and clearing and grubbing the right of way for the proposed land cut, and to include necessary borings and gaugings. During the year survey and location of trial and final lines for the canal were made. All the field work has been plotted and the maps will be finished soon. The precise levels were completed and were being checked at the close of the year, and most of the discharge observations had been computed. High stages of water prevented making borings along the line of canal, but it is intended to make them as soon as the river falls sufficiently, after which the right of way will be purchased and cleared and grubbed preparatory to excavation.

The benefits of the proposed work will consist in giving a navigable outlet to the streams of the Yazoo system at all stages by turning the river past Vicksburg to enter Mississippi in deep water at the bend at Kleinston, while restoring Vicksburg's river front; reducing the backwater limit of Mississippi, and at the same time relieving the pressure on Delta Point by contributing the discharge some 4 miles farther downstream, and finally in furnishing occasion for extending the line of levee protection of Yazoo Front. Steps have already been taken to organize a new levee district to fit in between the State district, which ends about 20 miles above Vicksburg, and that under the officer in charge of the fourth district of Mississippi River, with the view of cooperating with the United States and State engineers in completing the line of defense, and maps are now being made from those of the Mississippi River Commission, to be supplemented by local surveys.

With Yazoo Front permanently closed by substantial levees, the improvement of the streams forming the Yazoo system should be less expensive and more stable, since they should have only their own drainage to carry instead of being swollen by destructive additions from Mississippi River, and even if breaks should occur in the main line it is not believed that the disturbance would be either general or serious in any of them.

Amount (estimated) required for completion of existing project, $1,125,000; amount that can be profitably expended in fiscal year ending June 30, 1895, $1,125,000.

This estimate is $300,000 less than the original.

COMMERCE.

Twelve steamers were engaged in the traffic of the Yazoo River during 1892–'93.

Summary of commerce reported.

Articles.	1892–'93.	1891–'92.
	Tons.	*Tons.*
Cotton	11,094	15,653
Cotton seed	12,795	16,570
Hides and skins	26	19
Livestock	79	124
Lumber	3,122	3,318
Staves	12,488	6,864
Provisions	8,547	10,502
Grain	6,107	12,531
Saw logs	11,800	15,000
Miscellaneous	8,507	12,624
Total freights for Yazoo proper	74,565	93,205
Total freights from tributaries	124,887	116,021
Total freights, Yazoo and tributaries	199,452	209,226
Estimated value	$4,329,000	$7,351,500

AMITE RIVER AND BAYOU MANCHAC, LOUISIANA.

This river empties into the northern side of Lake Maurepas. The original project of improvement, adopted in 1880, provided for the removal of obstructions above the mouth of Bayou Manchac, so as to afford 5-foot depth so far as funds available would permit. In 1883 the project was modified so as to improve the river below Bayou Manchac; and in 1888 again modified to include work on that bayou.

The latter stream has been cleared for a distance of 9½ miles from its mouth, and the Amite put in good navigable condition below that point. No work has been done on the Amite above the bayou for the past few years.

By act of 1890 an appropriation of $3,800 was made for the improvement of the Amite River and Bayou Manchac, leaving the amounts to be expended upon each discretionary with the engineers. During the past fiscal year the work was confined to clearing the bayou of logs, snags, and impending trees for a distance of about 2½ miles above Hope Villa and from Hope Villa to the junction with the Amite River, leaving both streams in fairly good condition.

July 13, 1892, an appropriation of $2,500 was made for maintenance, $1,000 of which was to be used to construct a turning basin for boats at or near the mouth of Wards Creek, on Bayou Manchac. As this sum, $1,000, was not deemed sufficient with which to dredge out this turning basin, it has been held for further increase.

After thoroughly repairing the snagging plant used on this improvement, work was commenced November 17, 1892, with the remainder of the appropriation, at Wards Creek, on Bayou Manchac, and was carried on to Port Vincent, on the Amite River, removing the most dangerous obstructions, and resulting in improving about 20 miles of channel, giving much relief to the navigation of the river and bayou.

The amount expended on the improvement of these streams during the year ending June 30, 1893, was $1,415.85.

Owing to the caving of the banks of these streams, the permanent

improvement is hardly possible, and about $2,500 will be required annually to keep them free of obstructions.

An appropriation of $2,000 is required, in addition to the $1,000 now available, for dredging a turning basin for boats at or near the mouth of Wards Creek, on the Bayou Manchac.

Amount that can be profitably expended in fiscal year ending June 30, 1893, $4,500.

COMMERCE, 1893.

Four steamers carried 22,099 tons of freight, valued at $346,257, showing an increase of $12,196 over that of 1892.

BŒUF RIVER, LOUISIANA.

Bœuf River, or Bayou Bœuf, rises in southeastern Arkansas, flows in a southerly direction, and enters the Ouachita River at Staffords Point, about 10 miles above Harrisonburg, La.

The project for the improvement of this river, adopted in 1881, had for its object the removal of snags, logs, leaning trees, etc., obstructing navigation between Wallace Landing and its mouth, a distance of 152 miles. The closure of three outlets was recommended in 1884, at an estimated cost of $8,500. This latter work was completed in 1888 and proved very efficacious in reducing the sand bar at Port Jefferson, and the river in general was put in fair navigable condition up to a point about 19 miles below Wallace Landing.

This satisfactory condition of affairs was unfortunately disturbed in the spring of 1890, as the overflow from the floods in the Mississippi River broke down and destroyed the restraining dams and choked up the improved channels. This makes necessary their reconstruction in order to maintain navigation in the bayou; the estimated cost of this work is $30,000.

The amount expended to June 30, 1892, was $30,695.07, enabling steamboats to run to Point Jefferson, 19 miles below Wallace Landing, during high stages with safety, and below the Vicksburg and Shreveport railroad bridge navigation is safe at any stage high enough to permit boats to cross the bars. No work has been done during the past year. The amount that can be profitably expended in ensuing fiscal year, besides the $30,000 for the closures, $10,000 for the improvement of the river, making the total amount $40,000.

COMMERCE.

Three steamboats carried during the year 1892–'93 4,312 tons of freight, valued at $200,000.

BAYOU BARTHOLOMEW, LOUISIANA AND ARKANSAS.

This stream rises in southeastern Arkansas, near Pine Bluff, and, after flowing in an exceedingly tortuous course, enters the Ouachita River opposite Ouachita.

The project adopted in 1880 contemplated the removal of wrecks, snags, and overhanging timber, obstructing navigation between Baxter, Ark., and the mouth, a distance of about 150 miles.

The total amount appropriated to date is $38,000.

New obstructions are forming continually, which require removal from time to time; hence no estimate for permanent improvement is given.

The amount expended to June 30, 1892, was $32,651.90. Operations extended over the entire portion of the bayou included in the project, and some of the most obstructed parts were worked over two and three times, but not thoroughly in two seasons, as projected. However, the work performed at intervals has benefited navigation to a great extent. Before the improvement commenced the average duration of the navigable season was three months; now there is better navigation for about six months, and boats of double the capacity make trips with greater safety in half the time, and rates of freight are reported to have been reduced 50 per cent.

No work was done the past year on account of the short period of low water.

The amount that can be profitably expended in ensuing fiscal year, $10,000.

COMMERCE.

Three steamboats plied this waterway during fiscal year 1893, carrying 7,675 tons of freight, valued at $136,000.

BAYOU D'ARBONNE, LOUISIANA.

This stream is formed by the junction of the South, Middle, and North branches in northern Louisiana. It flows in a southerly direction, and enters the Ouachita River about 6 miles above Monroe, La.

The project for this improvement was adopted in 1884, and contemplated removing snags, logs, wrecks, leaning timber, etc., obstructing navigation from Stein Bluff, on the Corney Branch, to the mouth of D'Arbonne, 42½ miles, at an estimated cost of $15,000. The river and harbor act of 1892 required that operations be extended above Stein Bluff to the head of navigation on Bayou Corney, a distance of about 16½ miles. The estimated cost of removing obstructions to navigation in the latter stretch is $7,000.

The amount expended to June 30, 1892, was $10,874.94. Before the improvement commenced the bayou was navigable from six to seven months of the year. The work extended the period of navigation fully one month, enabled boats of double the capacity to make quicker time than those used formerly, with greater safety, reduced freight rates one-half, and extended navigation 16½ miles up the Corney Branch.

No work was done during the fiscal year ending June 30, 1893, on account of the limited period of low water.

The work is not permanent, as new obstructions are brought into the stream from time to time, but it is believed that with the funds now available, $1,000 less than the estimate, the work below Stein Bluff can be completed so as not to need further attention for several years. To complete the work to Cobb Landing, the head of navigation on Bayou Corney, it is estimated will cost $6,000.

The amount (estimated) required to complete the improvement $6,000. This entire amount can be profitably expended in fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

Articles.	1892–'93.	1891–'92.	1890–'91.	1889–'90.	1888–'89.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Cotton	1,839	2,610	2,738	1,500	2,500
Cotton seed	180	.....	500	1,000	.....
Hides	.....	.....	4	.....	5
Lumber (principally logs)	16	1,123	9,000	10,250	.....
Cotton-seed meal	250	150	.....	.....	.....
Staves	.....	10	.....	.....	.....
Miscellaneous	1,893	668	543	.....	.....
Total down freights	4,178	4,561	12,785	12,750	2,505
Return freights	1,324	1,697	1,187	1,666	1,670
Total freights	5,502	6,258	13,972	14,416	4,175
Estimated value	$440,000	$617,240	$683,500	$646,000	$500,000

The bayou is the only available means for transporting crops and supplies, except by hauling long distances in wagons to the Vicksburg, Shreveport and Pacific Railroad on the south, to the branch railroad at El Dorado, Ark., or to the Ouachita River.

TENSAS RIVER AND BAYOU MACON, LOUISIANA.

Tensas River flows from Lake Providence, La., in a southerly direction, and uniting with the Ouachita and Little rivers at Trinity, La., forms the Black River. By the act of 1884, Bayou Macon, a tributary entering the Tensas about 40 miles above its mouth, was united under the same head of appropriation.

The original project of improvement was adopted in 1881, and, as modified subsequently, provided for the removal of snags, logs, leaning timber, etc., obstructing navigation between Dallas and the mouth of the Tensas, about 134 miles, at an estimated cost of $23,000, and for removing the same class of obstructions in the Bayou Macon between Floyd and its mouth, about 98 miles, at an estimated cost of $17,000.

The total amount appropriated to date is $26,000.

The amount expended to June 30, 1892, was $17,980.64, of which $7,529.25 had been applied to the Tensas and $10,451.39 to the Macon. The obstructions were removed as far as practicable with these amounts, and in Bayou Macon, the principal commercial branch, had resulted in improved navigation so as to shorten the time of steamboat trips twelve hours.

In the fiscal year 1893 work was done on the bayou from Floyd down to within 16 miles of its mouth. It reduced the risk of navigation in the bayou to minimum, and enables boats to make the trip to Floyd in seven hours less time.

Lower Tensas River needs no work at present, and the available funds will be used in the removal of obstructions in Upper Tensas.

New obstructions are added from time to time, but it is believed that with the balance of the original estimate ($14,000), in one appropriation, both streams can be cleared of obstructions so thoroughly as not to need further attention for years.

COMMERCE.

During year ending June 30, 1893, these rivers were both navigable throughout the year for the six small steamboats carrying freight. The commerce for this period aggregated 2,649 tons and was valued at $122,500.

RED RIVER, LOUISIANA AND ARKANSAS, FROM FULTON TO THE ATCHAFALAYA.

The Red River is the southernmost of the great tributaries of the Mississippi, and rises near the eastern boundary of New Mexico. Flowing thence for a distance of nearly 1,200 miles through the States of Texas, Arkansas, and Louisiana, it enters the Mississippi near the mouth of the Atchafalaya. The portion included in this improvement extends from Fulton, Ark., to the mouth of the Atchafalaya River, a distance of about 525 miles.

Navigation on the Red River was formerly confined to the district below Shreveport, as the great raft, a collection of driftwood, trees, etc., about 15 miles in extent, effectually blocked the river a few miles above this city.

The improvement of the Red River was first undertaken by the Government in 1828, and appropriations aggregating $535,765.50 were made between 1828 and 1852. Between 1841 and 1852 no appropriation was made, and a longer interval elapsed between 1852 and 1872, during which period the results of former work were lost.

The present project was commenced in 1872, at which time navigation above Shreveport, La., was impossible on account of the great raft. The falls at Alexandria were impassable at low stages. Navigation below Shreveport to Grand Ecore was affected seriously by the gradual enlargement of Tone Bayou Outlet, which depleted the main channel, and the entire river was obstructed by snags, sunken logs, wrecks, and leaning trees. The project contemplates the removal of raft, snags, wrecks, leaning timber, etc.; closing Tone Bayou; opening a channel through the falls at Alexandria, and deepening the channel at sand bars; also protection of caving banks at Alexandria. Owing to the nature of the work it must be continuous for many years, and no estimate of final cost was made on this account.

The total expenditure to June 30, 1892, was $987,413.99, resulting in great benefit to navigation. A channel was opened through the great raft in 1873, and operations since, aided by the current, have secured an enlarged channel way with greater depth everywhere, continually widening and scouring, and but little water is diverted from the river proper at ordinary stages. The work of removing obstructions and clearing the banks and prompt removal of jams has prevented new formations of raft. No work has been done at Tone Bayou since 1882, when the dam under construction was destroyed. This outlet is filling up gradually with drift, and this, in connection with the work in the old raft region above, is causing the main channel to widen and scour. The rock excavation and dam at the falls of Alexandria was completed in 1885, increasing the period of navigation about two months, and as a general thing permitting boats to pass the falls the year round. The dam and training wall built at Alexandria in 1884–'85 for protecting the caving bank, accomplished the purpose for which intended. The removal of snags and clearing the banks for the general improvement of the river were not begun until 1878, but since 1885 operations have been confined to that class of work. The survey of Red River was carried from Fulton, Ark., to Grand Bend, La., near Alexandria, a distance of 406 miles. Under the act of 1888 work was extended into Cypress Bayou and Bayou Dorcheat, tributaries of Red River.

The work of the past year consisted in removal of snags and logs. The river, from Fulton to mouth of Black River, was worked over twice.

Navigation has been greatly benefited and the danger is reduced to a minimum.

The work at Alexandria was nearly finished.

The amount that can be profitably expended in fiscal year ending June 30, 1895, $800,000.

COMMERCE.

Freight by river.

Article.	1892–'93.	1891–'92.	1890–'91.
	Tons.	*Tons.*	*Tons.*
Cotton	14,061	29,400	21,613
Cotton seed	7,902	31,832	12,249
Cotton-seed meal	4,713	.....	10,000
Live stock	1,185	286	38
Hides and skins	62	151	212
Lumber	1,520	2,352	.....
Saw logs	15,200	22,250	16,523
Staves	1,739	206	81
Stone	.....	.....	.....
Miscellaneous	5,964	14,107	2,719
Total down freight	52,346	100,584	63,435
Return freight	17,605	19,942	30,051
Total	69,951	120,526	93,486
Estimated value	$3,424,000	$6,877,000	$9,185,000

In addition to the above, from Ouachita River, entering Red River at mouth of Black River, 88,441 tons, the value of which is estimated to be $4,446,000.

The reduced tonnage of the past fiscal year was due to the unprecedented flood ot 1892, which caused a short crop throughout the entire Red River Valley.

The following table shows receipts and shipments of cotton at Shreveport, La.:

	1892–'93.	1891–'92.	1890–'91.	1889–'90.	1888–'89.
Receipts.					
	Bales.	*Bales.*	*Bales.*	*Bales.*	*Bales.*
By rail	25,277	44,256	39,890	25,476	30,331
By wagon	31,612	49,644	37,725	40,026	35,450
By river	4,821	9,189	14,836	8,897	12,368
Warehouse receipts	61,710	103,089	92,449	74,399	78,149
Shipments.					
By Texas and Pacific R. R	26,904	36,645	23,311	23,690	20,582
By Vicksburg, Shreveport and Pacific R. R	10,384	23,251	15,564	20,813	24,029
By Shreveport and Houston R. R	3,114	5,353	13,860	12,529	494
By St. Louis Southwestern R. R	7,818	24,187	15,039	8,820	24,125
By river to New Orleans	14,751	10,567	19,218	8,412	8,956
Total	62,971	100,003	86,992	74,264	78,184

The water route from Shreveport, La., to Jefferson, Tex., through the lakes and Cypress Bayou, was navigable from November 24 to June 30. The number of trips made by steamboats is included in the foregoing list, and the freights reported were as follows: 66,151 tons of freight, valued at $535,000.

TICKFAW RIVER, LOUISIANA.

This river empties into the northern side of Lake Maurepas.

Congress authorized an examination of this river in 1879. A project was submitted in 1881 to clean out the river and its principal tributaries, the Natalbany, Blood, and Pontchatoula rivers, by removing the obstructions, at an estimated cost of $10,230.

To the close of the year ending June 30, 1892, there had been expended on these streams the sum of $7,777.96. The work done has resulted in a very material increase in the commerce of the river. Most of the shipments are made direct to New Orleans.

Under the appropriation of July 13, 1892, work was commenced at the mouth of the river on December 20, 1892. The results of operations during the fiscal year was the improvement of about 30 miles of channel by removing obstructions, at a cost of $1,018.34.

Obstructions will continue to form in all these streams, and the improvement, therefore, is not permanent. It is estimated that $1,000 will be required annually to keep the channels in good condition.

COMMERCE.

Five steamers plied this river during 1893, 13,990 tons of freight, valued at $169,643. This shows an increase of $67,527 over previous year.

BAYOU PLAQUEMINE, LOUISIANA.

In compliance with the river and harbor act of 1886 a survey was made of the mouth of the Plaquemine, with a view to its connection with the Mississippi by locks.

The project, subsequently adopted, provides for the opening of the water route indicated by removal of snags, dredging, and constructing a lock at the mouth of the bayou. The estimated cost of this work is $1,708,250.

The present water route from the Teche to New Orleans is, approximately, 425 miles in length; if the Plaquemine route were opened, this route would be shortened about 180 miles, or give for the products of the Teche a water route to market 245 miles long instead of 425 miles, as at present, and thereby lessen the cost of transportation of the annual product of this, the richest sugar country in Louisiana. The estimated annual value of the output of the Teche country is $3,358,000. This is for the sugar and molasses alone; other products would probably bring the aggregate output to $4,000,000 per annum. Not more than 10 per cent of this freight has of late years been carried to New Orleans by the all-water route, one reason for this being that not more than one boat could profitably carry freight 425 miles in competition with a railroad whose haul was only 125. By shortening the water haul, as above indicated, the boats can carry for less money, and the railroad will therefore have to reduce its freight rate and thus directly benefit every planter in that section of the country.

The first appropriation for this work, $100,000, was by the act of 1888, "for securing a navigable channel, 60 feet wide and 6 feet in depth, from deep water up to the Plaquemine Dike, and for securing the mouth of the bayou from further caving, pursuant to plan recommended by the engineers." As a matter of economy the protection work was transferred to the officer in charge of the fourth district of the Mississippi River, who has a plant available for the work and $75,000 allotted to this work; the remainder was devoted to dredging out the bayou so as to give a channel 60 feet wide and 6 feet deep at mean low-water level of the gulf.

This dredging progressed until, at the end of June, 1891, it had nearly reached the railroad bridge. The cut was about 5 miles long and 30 feet wide, and $16,948.31 had been expended on this work at that time.

In 1890 $100,000 was appropriated for continuing the improvement. Of this sum $60,000 was allotted for bank protection at the mouth. A project for the expenditure of the remainder by commencing work upon the lock was presented, but as the lock proposed by a Board of Engineer officers was estimated to cost $700,000, the sum available was held for increase by further appropriation by Congress.

The total expended on this improvement to June 30, 1892, from funds allotted to this office was $23,830.72.

In 1892 $150,000 was appropriated for continuing the improvement, of which $10,000 was for improving Grand River and Pigeon bayous.

Under this latter considerable improvement has been made in Grand River, and measures are on foot for the improvement of Pigeon bayous.

The amount expended on this work during the year ending June 30, 1893, was $8,821.83.

The property needed for the site and approaches to the lock at Plaquemine has been expropriated, but the amount available for commencing work on the lock was not considered sufficient to carry it to a point of safety, and the balance is held for increase.

The amount (estimated) required to complete the entire improvement is $1,358,250; amount that can be profitably expended in fiscal year ending June 30, 1895, $500,000.

For continuing the work of improving Grand River and Pigeon bayous, forming a part of the Bayou Plaquemine route, it is recommended that $10,000 be appropriated for the next year, the completion of which work will afford immediate temporary relief to the commerce of the Teche country.

COMMERCE.

Shipments for two years.

Articles.	June 1, 1891, to May 31, 1892.		June 1, 1892, to May 31, 1893.	
	Tons.	Value.	Tons.	Value.
Sugar and molasses	2,263	$142,920	1,254	$117,730
Moss	55	2,750	25	1,320
Miscellaneous freight	927	58,268	350	21,000
Cotton and cotton seed	.....	.....	83	3,850
Lumber, shingles, etc	128,630	1,139,670	77,044	1,030,850
Total	131,875	1,343,608	78,756	1,174,750

Some idea of the importance of this line of communication can be gleaned from the following table of the value of the commerce carried upon the various streams to which access will be afforded by the completion of the Plaquemine Lock. The figures are compiled from the report of the Chief of Engineers, and are for the year ending May 31, 1891:

Red River	$6,877,000
Ouachita and tributaries	6,680,600
Courtableau and Des Glaises	3,917,344
Bayou Plaquemine	206,700
Bayou Teche	1,715,026
Bayou Vermillion	1,500,000
Total	20,896,670

BAYOU LA FOURCHE, LOUISIANA.

Before any work of improvement the bayou was so obstructed with snags, logs, and wrecks, from its head at Donaldsonville to a point about 22 miles below Lockport, that during the low-water season flat-boats and luggers drawing 2 feet of water were the only vessels able to navigate.

The original project, adopted in 1879, had for its object the removal of these obstructions, and under this project work was carried on until 1885, during which time $28,754.45 was expended, resulting in much relief and benefit to navigation.

The act of 1888 appropriated $50,000 for improving this bayou pursuant to the project of Lieut. O. T. Crosby, dated June 11, 1886, and for immediate dredging to secure low-water navigation.

The project referred to, which is the approved plan, is the construction of a lock connecting with the Mississippi River at Donaldsonville, thus converting the bayou into a salt-water canal, and the subsequent dredging of the channel to a width of 75 feet, with a depth of 5 feet at mean low water of the Gulf of Mexico.

Under the provision of this act dredging was commenced at the head of the bayou, and has been continued since, with considerable benefit to the low-water navigation, but it is a very unsatisfactory method of improvement, since much of the work has to be gone over again after the subsidence of the flood in the Mississippi River. If the lock was constructed, whatever dredging was thereafter done in the bayou would be practically permanent and the certainty and safety of the navigation of the bayou assured.

There has been expended on this improvement up to date, $105,334.53. Amount required for completion of existing project, $350,000. Amount that can be profitably expended in next fiscal year, $100,000.

COMMERCIAL STATISTICS.

[From June 1, 1892, to May 31, 1893.]

Number of steamers	16
Number of trips out of bayou	460
Aggregate tonnage of same	119,460
Number of barges entering bayou	92
Aggregate tonnage of same	76,103
Total vessels	108
Total trips	552
Total tonnage	195,563

In addition to the above, there are 3 steamers running between points on the bayou carrying passengers, which, during the year, made 230 trips, the tonnage aggregating 10,075 tons. Besides, there are 9 barges which ply regularly from the lower end of the bayou, carrying freight of all kinds in connection with a railroad. There are 50 other barges which carry all kinds of freight (when the water is low in the bayou), connecting with the steamers on the river at the head of the bayou. The carrying capacity of these 59 barges is equal to 5,151 tons.

CHEFUNCTE RIVER AND BOGUE FALIA, LOUISIANA.

The project for this improvement, made in 1880, contemplated the removal of overhanging trees, clearing the channel of logs, etc., and the dredging of the bar at the mouth of the river. The obstructions were removed, but the bar was not dredged, as it would be likely to reform unless prevented by expensive structures; about 800 feet, however, of brush piling was constructed as a partial breakwater.

Snags, logs, and impending trees were removed from the channel of the river from Madisonville to Old Landing, and from the latter place to Covington, on the Bogue Falia, as far as the funds on hand would permit. The principal obstructions removed from the channel during the year were: 161 snags, 82 overhanging trees, 61 landslide trees, 58 stumps, 44 logs, and 29 tree tops. The work was discontinued November 30, 1891.

In 1892 an appropriation of $1,000 was made for maintenance. Aside from making extensive repairs to the snagging plant used on the improvement of these streams, no work was done during the year.

The total amount expended on the improvement to June 30, 1893, was $6,758.74.

The river now has a navigable depth of 5 feet to Old Landing, and from there to Covington the Bogue Falia is navigable for the lighter-draft schooners.

About $1,000 will be required each year to keep the river and bayou free of obstructions.

The commerce for the year 1893 was valued at $429,126.

BOGUE CHITTO, LOUISIANA.

Bogue Chitto is a small river, which, rising in Lincoln County, Miss., flows in a southeasterly direction and enters Pearl River in St. Tammany Parish, La.

The project for the improvement of this river, submitted in report of examination provided for by river and harbor act of August 11, 1888, was adopted in 1890, the object being to obtain a 3-foot channel during the greater part of the year by the removal of logs, snags, fish traps, etc., from the mouth up to Alfords bridge, at an estimated cost of $55,000.

The amount expended during the fiscal year ending June 30, 1892, was $1,000, and was applied to preparation of plant for the work.

The amount expended during the fiscal year ending June 30, 1893, was $2,072.40, and was applied to the construction of a snag boat and a barge.

There is no change in the condition of the river, the work of improvement not having been begun.

Amount (estimated) required to complete existing projects, $45,000; amount that can be profitably expended in ensuing fiscal year, $20,000.

The annual saving in freight that would be affected by the improvement of this river to the present commerce is estimated at about $30,000.

MERMENTEAU RIVER AND TRIBUTARIES, LOUISIANA.

The Mermenteau River is formed by the junction of Bayou Cane and Bayou Plaquemine Brulé, and the point of junction is about 5 miles above the town of Mermenteau, a station on the Southern Pacific Railway. The river throughout its entire course is never less than 400 feet in width, and frequently like other tidal streams expands to four times that distance. In the river proper the depth varies from 15 to 50 feet.

There are a few snags, but the stream is so large and their position so well known that they can scarcely be called obstructions to navigation. In case of the lakes the situation is different.

A survey of this river, including its tributaries and course through Lake Arthur and Grand Lake to the Gulf of Mexico, was made in 1891.

At that time the least depth at Viterboville and for a distance of 5 miles below that point was 7 feet; thence to Lake Arthur the depth was not less than 30 feet. Through Lake Arthur the channel had a minimum depth of 7 feet. From Lake Arthur to Grand Lake the least depth was 24 feet. Through Grand Lake the uniform depth was 6 feet. Immediately below Grand Lake the river was 30 feet deep, but the depth from that point to the mouth gradually decreased. At the mouth inside the depth was 13 feet. About 5 miles above the mouth, at the head of a lake, occurred a shoal, through which a channel was found of 7 feet, available for steamers, but too crooked for sailing vessels which could not carry more than 5 feet over the flats. All the soundings were referred to mean low tide in the gulf.

In 1892 a project was approved which contemplated the removal of obstructions, such as logs, snags, and overhanging trees, in the upper river and a mud flat in the lower, the removal of this flat to be accomplished by brush wing dams. The cost of improving this stream from Viterboville, on the Bayou Nezpique, to the mouth of the Mermenteau River was placed at $23,615.25.

July 13, 1892, an appropriation of $7,500 was made for this improvement.

Work under this appropriation was commenced December 8, 1892, with hired plant under contract at the lower end of Lake Arthur, and was carried on up the Mermenteau River, improving about 38 miles of channel by removing snags, overhanging trees, etc., materially lessening the dangers of navigation on that portion of the stream which is most used. Work ceased on March 7, 1893.

The amount expended on this work to the close of the year ending June 30, 1893, was $7,054.03.

The amount (estimated) required to complete improvement, $16,115.25; amount that can be profitably expended in fiscal year ending June 30, 1895, $10,000.

COMMERCE.

Articles.	Tons.	Value.
Rice	11,900	$309,400
Lumber	150	1,500
Wood	4,000	4,000
Merchandise	200	10,000
Total	16,250	324,900

BAYOU VERMILLION, LOUISIANA.

This stream, rising in the parish of St. Landry, flows in a southerly direction for a distance of approximately 90 miles to its mouth, where it empties into the bay of the same name. It may be said to be navigable for its entire length, as all parts of it have been used for the transportation of crops and supplies, but the construction of Morgan's Railroad across the upper portion has caused an entire cessation of all traffic above the crossing.

A preliminary examination of the bayou, bay, and passes was made in January, 1891. At that time the upper 12 miles of the bayou had not a navigable depth of much over 2 feet, and below that the depth was not less than 5½ feet through the bayou, bay, and passes. The width of the bayou was from 100 to 400 feet.

The approved project of 1892 contemplated the removal of obstructions, such as snags, sunken logs, and impending trees in the bayou, and the marking of the channel through the bars in the bay with guide piles. The estimated cost of the improvement, to provide for 5½ feet depth of water up to the railroad bridge, was $25,000.

July 13, 1892, Congress made an appropriation of $7,500 for this work. Work under contract was commenced December 1, 1892, at a point about 18 miles above the mouth, improving 37½ miles of channel and scouring a depth of 5½ feet over that portion of channel improved by removing snags, logs, overhanging trees, and other obstructions.

The amount expended to June 30, 1893, was $5,923.20.

The amount required to complete existing project, $17,500; amount that can be profitably expended in fiscal year ending June 30, 1895, $10,000.

COMMERCE.

Five steamers carried 35,676 tons of freight during the year 1893; the value of the above freight was $1,227,365. The sugar and molasses trades will be greatly benefited by this improvement.

COURTABLEAU BAYOU, LOUISIANA.

At the time of the adoption of the present project the back water from the Atchafalaya River formed a large sand deposit, known as Little Devil Bar, at the mouth of the Courtableau.

The approved project of 1880 contemplated the closing of some run-out bayous in order to confine the water in the Courtableau and cause its current to wash out the bar at its mouth; after this was accomplished, then to construct a timber lock and dam to give slack-water navigation to Washington, La. In 1883 the estimate was increased to $78,500, and provided for a masonry lock.

The total amount appropriated to date is $31,200.

Up to June 30, 1892, the sum of $30,781.70 had been expended in closing run-out bayous, with the effect of partially removing the bar.

In 1890 $2,200 was appropriated. With this money work was commenced September 8, 1891, and continued until November 20 of that year, using the Government plant and hired labor. During this time the dams at bayous Cane, Mamzelle, and Big Fordoche were all repaired with piles and sheet piles, brush aprons being placed above and below them, and all were left in good condition. The sum of $260.85 has been expended on this improvement during the year ending June 30, 1893. Nothing has been done during the past year beyond the care and preservation of the plant.

Little Devil Bar has washed out considerably under the influence of the dams, so as to give a navigable depth at a stage of water in the Atchafalaya river 7 feet below the level at which navigation was interrupted in the summer of 1891, but it is considered doubtful if, with all the run-out bayous closed, a channel navigable at low water can be maintained over this bar which, under any circumstances, will certainly form at each high water of the Atchafalaya.

The dams are in fair condition, but the older ones will require extensive repairs in another year.

The success of the dams so far built appears to warrant their maintenance, and the permanent closure of the remaining run-out bayous.

There seems to be sufficient water in the bayou to wash out the bar at its mouth, formed by the backwater of the Atchafalaya, if it can be held within the banks which the closure of the run-out bayous by dams appears to affect.

The amount that can be profitably expended in fiscal year ending June 30, 1895, $5,000.

COMMERCIAL STATISTICS.

[From June 1, 1892, to May 31, 1893.]

Number of steamers	5
Number of trips	96
Tonnage	20,068

TECHE BAYOU, LOUISIANA.

Before improvement the bayou had a navigable depth of 8 feet, but the channel was greatly obstructed by snags, trees, and wrecks.

The project adopted contemplated the removal of these obstructions, and money having been appropriated the stream was thoroughly cleared from Port Barre down.

In 1886 this work was completed, but further obstructions had formed in the bayou since then, and in 1890 an appropriation of $5,000 was made with which to accomplish their removal, the work to be confined to that portion of the stream between the mouth and St. Martinsville.

Work under this appropriation was commenced by hired plant on October 12, 1891, and continued until December 10 of that year, resulting in the improvement of about 59 miles of channel from St. Martinsville down, and giving much relief and satisfation to the commerce of the bayou.

No work was done during the past year.

The amount expended on the improvement of this stream to June 30, 1892, was $54,349.16.

Sunken logs, fallen trees, and coal-boat wrecks are continually forming obstructions in the bayou, consequently the improvement can not be considered as permanent.

The stream is also obstructed at present by shoals, caused by material being washed into the channel by drainage ditches. The navigable depth over these bars at times during the low-water season is not more than 3 feet.

As the low-water season occurs at the time of marketing the crops, this condition is becoming of serious import to the various interests involved.

It is believed that $30,000 can be most advantageously expended during the ensuing year in dredging and removing obstructions from the channel.

COMMERCIAL STATISTICS.

[From June 1, 1892, to May 31, 1893.]

Number of steamers	2	Tonnage	62,347
Number of trips	42	Total number of vessels	77
Tonnage	8,500	Total trips	117
Number of barges	75	Total tonnage	70,847
Number of trips	75		

The above refers entirely to the tonnage to and from the Mississippi River, and does not include the number of trips, or tonnage, of the three steamers and barges running from Morgan City to points on the Bayou Teche in connection with the railroad, nor does it include the steamers, their trips and tonnage, which annually tow many rafts of logs from the Atchafalaya River to the sawmills on the bayou.

BUFFALO BAYOU, TEXAS.

This bayou, a tide-water stream empting into the San Jacinto River, at Lynchburg, about 25 miles from Houston, was, in 1880, only navigable for vessels of 6-foot draft below Houston. For 3 or 4 miles below White Oak Bayou the banks ranged from 20 to 45 feet in height, and at points were very bluff, with a tendency to caving during high water. The narrowness and tortuousness of the bayou for this distance, with its sharp bends, were the most serious obstructions to its navigation.

The present project for its improvement was adopted in 1880, the object being to straighten, widen, and deepen the channel to a depth of 12 feet and a width of 100 feet at bottom, between the city of Houston and Simms Bayou, 11 miles below, and to remove such snags, stumps, and overhanging trees as were obstructions to navigation. The estimated cost of this project was $385,299.75.

The total amount appropriated to date is $193,750.

The amount expended to June 30, 1892, was $165,803.99. It has resulted in clearing the channel of the most prominent stumps, snags, and overhanging trees, in easing most of the bends, and in removing such shoals as obstructed a 7-foot navigation. The amount expended during the past fiscal year was $7,413.99, and has resulted in a further easement of bends and deepening of the bayou, so that a 10-foot channel is now available in the portion of the bayou worked over this year. Obstructions were also removed from the bed and banks of the stream. These obstructions are renewed in more or less degree every year through action of floods. The project is not capable of permanent completion.

The trade of the bayou is principally carried on by the Houston Direct Navigation Company with tugs and barges, but many small vessels visit it. To ascertain the extent of this trade, a special agent was employed to keep a daily record of the commerce and tonnage of the bayou. Large shipments of cotton are made from Houston to Galveston by water, to be loaded on seagoing vessels at the latter place. The number of bales shipped down the bayou during the present fiscal year was 279,316.

The amount (estimated) required to complete existing project, $191,549.75; amount that can be profitably expended in fiscal year ending June 30, 1895, $50,000.

COMMERCE.

Year.	Cotton.	Cotton-seed cake.	Wood and coal.	Lumber and shingles.	Iron and steel.	General merchandise.	Total weight.	Total value.	Total freight charges.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*		
1888	26,692	9,959	4,320	2,765	1,509	4,596	49,841	$5,132,323	$94,960
1889	41,227	12,628	3,456	1,221	1,120	898	60,550	7,617,380	98,794
1890	66,852	19,199	2,970	512	1,278	5,423	96,234	13,880,766	154,715
1891	81,548	12,469	9,810	622	.....	3,639	108,088	16,243,395	156,906
1892	84,189	21,750	15,595	1,538	.....	9,112	132,179	13,790,650	206,719
1893	69,829	10,767	8,343	1,001	.....	16,706	106,646	12,836,894	175,759

TRINITY RIVER, TEXAS.

This river empties through several mouths or passes into Galveston Bay near its northeast extremity, about 35 miles from Galveston. Opposite the mouth of each of these passes is a bar.

The present project for the improvement of this river was adopted in 1873 and modified in 1889, the object being to afford a navigable

channel 6 feet deep through the channel at the mouth of the middle pass. The natural channel was narrow and had a depth of but 3 feet 2 inches.

On several occasions channels have been dredged and afterwards obliterated by natural causes. In 1885 one was dredged through the bar and revetments placed upon each side to prevent the excavated material from flowing back into the cut. It is now proposed to extend timber jetties from the ends of these revetments out to a depth of 6 feet in Galveston Bay.

The total amount appropriated for this work is $67,000.

The total expended to include June 30, 1892, was $56,119.68, at which time one jetty was nearly completed, resulting in a depth of 3 feet 6 inches on the bar and straightening the channel. The amount expended during the fiscal year ending June 30, 1893, was $627.25, and was used principally in making a survey with a view to preparing project for expenditure of amount appropriated for this work by the river and harbor act of July 13, 1892.

The depth of 3 feet 6 inches over the bar has been practically maintained by the jetty previously constructed.

The amount (estimated) required to complete existing project, $22,500; the amount that can be profitably expended in fiscal year ending June 30, 1895, $22,500.

COMMERCE.

Comparative statement of commercial statistics of Trinity River, Texas, for the fiscal years ending June 30, 1888, 1889, 1890, 1891, 1892, and 1893.

Year.	Vessels using river	Maximum length.	Maximum draft.	Maximum tonnage.	Trips made.	Total tonnage.	Transported.				Total value of cargoes.	Total freight charges
							Cotton.	Lumber.	General merchandise.	Total weight.		
	No.	*Feet.*	*Feet.*	*Tons.*	*No.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*		
1888....	32	65	4.7	32	1,217	15,958	226	11,863	855	12,944	$88,704	$17,027
1889....	36	65	4.5	32	1,330	16,737	148	10,872	1,159	12,179	75,902	17,276
1890....	33	80	5.5	80	1,221	16,887	102	10,906	719	11,727	46,347	14,249
1891....	30	80	5.5	80	1,115	15,733	38	9,364	555	9,954	47,034	13,582
1892....	30	120	5.6	150	1,100	13,994	37	8,753	794	9,584	61,810	13,049
1893....	32	150	5.6	150	1,115	15,641	217	8,933	319	9,469	52,907	11,697

CYPRESS BAYOU, TEXAS.

The plan for improving the lakes and bayous between Jefferson, Tex., and Shreveport, La., contemplates the construction of a dam, with waste weir across Sodo Lake, with entrance from Red River through Cottonwood Bayou by a lock with double gates, at an estimated cost of $375,000. But as the plan of improving Red River is carried out and the outlets closed along its right bank, the water supply of Cypress Bayou and the lakes will be limited to the natural drainage of their basin, with what might be let in from Red River through Cottonwood Bayou, or through sluices near by.

The commercial statistics given with the report on Red River show the business of Cypress Bayou, so far as could be learned by persistent inquiry, and include the fiscal years since July 1, 1889, when a more systematic plan was begun to get the information. No doubt the business would increase if navigation were assured even only in early spring when supplies are most in demand and in the autumn when cotton is the chief shipment, and if only the slack-water route bore promise of

lasting beyond a decade the work would be recommended even at greater cost than the estimate.

The appropriations by the United States were as follows:

By act of—	
June 10, 1872	$10,000
March 3, 1873	50,000
August 14, 1876	13,000
June 18, 1878	15,000
March 3, 1879	6,000
August 5, 1886	18,000
August 11, 1888, allotted from appropriation for Red River	5,000
September 19, 1890, for survey	10,000
July 13, 1892, for survey	2,000
July 13, 1892, allotted from appropriation for Red River "in discretion of the Secretary of War"	5,000
Total	134,000

SABINE RIVER, TEXAS.

At the commencement of the improvement of the river there was a depth of 3½ feet on the bar at its mouth and also above the town of Orange. Logs, snags, etc., above here interfered with navigation.

In 1880 a channel 6 feet deep, 70 to 100 wide, was dredged through the bar. In 1881 several small cuts, to avoid bends obstructed with logs, were made above Orange.

The products shipped by water are cotton, corn, rice, cotton seed, and general merchandise, and an immense amount of logs for the mills at Orange, where they are manufactured into lumber. The annual output of the mills is about 120,000,000 feet of lumber, 30,000,000 shingles, and 10,000,000 lath and pickets.

The removal of the snags will meet the requirements of the river commerce for the present, but it is not expected that this improvement will be permanent.

In the report on the examination of this stream, authorized by the river and harbor act of 1890, it is recommended as worthy of improvement. The work proposed consists of the removal of snags between Sabine Lake and Sudduths Bluff, at an estimated cost of $10,000.

The amount expended on the improvement of this river to June 30, 1892, was $34,613.12.

July 13, 1892, Congress appropriated $5,000 for improving Sabine River up to Sudduths Bluff, Texas.

A snagging plant has been contracted for, and work under this appropriation will be commenced July 1, 1893. The amount expended during the year ending June 30, 1893, was $181.92.

After the obstructions in the river between its mouth and Sudduths Bluff are removed about $2,000 will be required annually to keep the stream in navigable condition.

Five thousand dollars will be required to complete the improvement; this amount should be expended in ensuing fiscal year.

COMMERCE.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
Lumber	137,368	$891,180	Wool	120	72,000
Cotton	1,750	227,000	Merchandise	1,200	60,000
Cotton seed	1,925	23,100			
Staves	4,000	318,000	Total	146,363	1,591,280

Draft of steamers, light, 16 inches; loaded, 5 feet. Draft of schooners, loaded, 9 feet. Steamers run 510 miles above mouth of river to Logansport during high water.

ARKANSAS RIVER, ARKANSAS AND INDIAN TERRITORY.

The Arkansas River is one of the largest affluents of the Mississippi, and serves as a great water highway for the transportation of the products of a large area of the Southwest.

As the first expenditure of money on this river was made as early as 1833, it is not an easy matter to determine what was the original condition of the navigable portion of this stream, but from the delta-like character of its lower portion and the tendencies now manifest in its upper reaches it may be inferred upon very substantial grounds that shifting sand bars, numerous drift piles, and dangerous snags characterized the obstacles to navigation in the lower reaches; and gravel and rock shoals, with a few snags and many overhanging trees, constituted those of the upper reaches.

By act of August 11, 1888, the sum of $150,000 was appropriated for the improvement of this river, under plan providing for the formation of a channel at least 200 feet wide and 6 feet deep at low water from Little Rock to the Mississippi River, and the formation of a channel 2 feet deep at low water and from 200 to 300 feet wide from Fort Gibson to Arkansas City.

By act approved September 19, 1890, the sum of $180,000 was appropriated. By act approved July 13, 1892, $250,000 was appropriated. The approved projects for the expenditure of this amount may be summarized as follows:

At Van Buren, $4,000 to be expended in erecting a permeable dike at a suitable point a little above the town and upon the opposite side of the river, to contract the channel and prevent it from leaving the city wharves. From Fort Gibson, Ind. T., to the mouth of the river the balance to be expended in the erection of permeable dikes and in rock excavation at worst places, so far as the amount of the appropriation will permit, to give a channel at least 6 feet deep and 200 feet wide from Little Rock to the mouth of the river, via White River Cut-off, and an all-year round depth of water of at least 2 feet from Little Rock, Ark., to Fort Gibson, Ind. T.

Before operations were begun at Dardanelle a bad bar had formed along the town front, cutting off all approach to either wharf at low water or at medium stage.

From Fort Gibson to the mouth of the river the river consists of alternating bars and caving banks, with crossings more or less troublesome at low water, a few of the latter operating to effectually close the river to navigation at extreme low water, even for boats drawing but 2 feet of water.

From Fort Gibson, Ind. T., to the mouth of the river $177,897.93 has been expended during the fiscal year ending June 30, 1893.

The work was carried on under three allotments, so far as the appropriation for 1892 is concerned, two-fifths of this amount being intended for the reach from the mouth of the river to Little Rock, two-fifths from Little Rock to Fort Smith, and one-fifth above Fort Smith.

The project for this last appropriation consisted practically in the solidifying of works already in existence, that were erected out of perishable materials, with new works in accordance with the general plan after these had been completed.

At Moores Rocks a channel 75 feet wide, 425 feet long, and 2 feet deep at low water was completed. Dikes above Fort Smith were converted into solid stone-capped dikes. At Van Buren the old dike was solidified, as was also the railway incline.

At Dardanelle work at solidifying the old dike and the construction of the new brush and stone dike was begun.

A large quantity of rock was quarried at Big Rock, 3 miles above Little Rock, and taken down the river for works below. Some of this rock was also used for the conversion of dikes above the Barring Cross bridge into solid stone-capped dikes, and in the erection of two additional dikes 150 feet long and 7 feet above low water. The four dikes below the Little Rock and Fort Smith Railway bridge were converted into solid dikes.

The total amount appropriated for this river since 1876 is $1,241,875.

The amount required to complete existing project, $3,222,479. Amount that can be profitably expended in fiscal year ending June 30, 1895, $1,500,000.

The engineer in charge says:

> It is a matter of plain duty to insist that prompt and appreciable results can not be expected with $250,000 when $1,000,000 is required, and as matters now stand if anything like effective work, with economy, is expected, at least $1,500,000 could be profitably expended during the year ending June 30, 1895.

COMMERCE.

Commencing at the head of navigation on the Arkansas River, thence following down through the fertile valley tributary to it, are Wichita, Arkansas City, Fort Smith, Dardanelle, Little Rock, and Pine Bluff, six of the largest cities in the State, which, together with their surrounding counties, have a population of over 400,000 inhabitants. The commercial growth and prosperity of these cities demand an outlet by way of this river. The following table shows over 1,000,000 tons of freight that will be cheapened by the improvement of the Arkansas River:

Tonnage, 1890.

	Tons.
Arkansas City, Cowley County, Ark	420,036
Fort Smith, Ark	51,526
Dardanelle and vicinity	21,850
Little Rock	689,476
Pine Bluff	509,828
Total	1,701,716

ST. FRANCIS RIVER, ARKANSAS.

This river rises in southern Missouri, flows in a southerly direction, and enters the Mississippi near Helena, Ark.

Prior to the first appropriation in 1833 the river was obstructed by drift piles, logs, snags, and overhanging trees, and its waters spread out in a great many sloughs. The originally adopted project was principally for snagging operations, and attempts have been made to close up some of the sloughs.

This river has been united with the White River in appropriations, so that the amount expended upon it can not be exactly stated. The separate appropriations for this river, beginning in 1884, amount to $36,000. The worst places on the river have been relieved, the work being carried on systematically and effectively, but there is much yet to be done.

During the fiscal year ending June 30, 1893, $3,795.61 was expended in the continuance of the project, in the execution of much-needed work between Madison, Ark., and the mouth of the river.

High water prevented the economical expenditure of the balance.

Amount (estimated) required for work annually, $8,000; amount that can be profitably expended in ensuing fiscal year, $28,000.

Before improvement the commerce of the river was practically nothing. The territory drained by the river is almost entirely dependent upon it for transportation. An immense body of the finest timber lying to the east of the river is awaiting its improvement. The following estimate of yearly commerce is for the upper river:

Lumber	$3,150,000	Potatoes	100,000
Staves	225,000	Miscellaneons	300,000
Cotton	450,000		
Corn	300,000	Total	4,825,000
Pork	300,000		

From the lower two-thirds of the river, during medium and high water stages, there are shipped weekly 25,000 bales of cotton, 250,000 sacks of cotton seed, and about 175 tons of merchandise.

REMOVING OBSTRUCTIONS IN ARKANSAS RIVER AND OPERATING SNAG BOATS.

Shifting sand bars, numerous drift piles, and dangerous snags constituted the obstacles to navigation in the lower reaches, and gravel and rock shoals, with a few snags and many overhanging trees, constituted those of the upper. Except for a few special reaches, like the Fort Smith and Pine Bluff, the general plan of improvement has consisted in snagging operations, including the cutting of overhanging trees, and in building wing dams to improve the shoals.

The appropriations to June 30, 1893, amount to $505,251.37. Of this sum there had been expended to June 30, 1892, $410,446.10.

During the fiscal year ending June 30, 1893, $22,073.54 was expended in snagging operations at or near low water, and in construction of snag boat.

Snagging has been carried on, and the navigation of the river is rendered yearly less dangerous.

The most economical management of snag boats requires not less than $35,000 annually to give absolutely indispensable aid to navigation, a navigation in which a vast amount of commerce is vitally interested.

The amount that can be profitably expended in ensuing fiscal year, $70,000.

BLACK RIVER, ARKANSAS AND MISSOURI.

Black River rises in southern Missouri and, flowing in a southerly direction, empties into White River at Jacksonport, Ark.

Before improvement the channel was much obstructed by logs, snags, shoals, and overhanging trees.

The original plan contemplated the improvement of the shoals by the construction of wing dams, a removal of the obstructions, and the closing of a few sloughs to confine the water to the main channel.

Up to June 30, 1892, $65,961.44 had been expended, the work of 1892 finally opening the river to Poplar Bluff, Mo., so that boats could reach that point during high and medium stages with reasonable facility.

During the fiscal year ending June 30, 1893, the funds appropriated by act approved July 13, 1892, were utilized in operating a hand-pro-

pelled snag boat from Poplar Bluff, Mo., to the mouth, removing the most dangerous recently accumulated obstructions.

Total amount appropriated for this improvement is $78,000; this is included in an appropriation of $7,000 in 1888 for Black River, Missouri.

The commerce has increased as the work has progressed. In 1879 it was estimated that 10,000 or 12,000 bales of cotton were shipped among other items. The shipments of cotton are now estimated at 15,000 bales annually; 3,000,000 staves, 20,000,000 feet of lumber, 45,000 bushels of grain, and $20,000 worth of hogs and bacon are other estimated items of yearly business on the river. The annual tonnage of the river amounts to 97,720 tons. There is a vast tract of country for which the Black River is the natural highway. This river is one of the deepest in the State.

The engineer in charge says:

> My plan has been to secure an annual contingent of $8,000 for this work, but this has been departed from so far in the amounts of the appropriations that nothing less than $42,000 would adequately meet the requirements of the situation. It may be stated that with the expenditure of this sum as a whole a magnificent artery of commerce would be effectively opened, which would need but very little attention for its maintenance.

WHITE RIVER, ARKANSAS.

The White River rises in the northwestern part of Arkansas and, after making a detour into Missouri, traverses the southeastern part of the State and empties into the Mississippi River about 14 miles above the mouth of the Arkansas. Its total length is estimated at 800 miles, of which over 300 are navigable.

In its original condition this river was choked with drift, logs, and snags in its lower portion, and from Batesville up gravel bars, rocky shoals, channel bowlders, and overhanging trees impeded navigation. The original project consisted in snagging operations, the blasting of ledges and bowlders, the building of dams to remove gravel bars or to close chutes.

The first separate appropriation for this river was made in 1884. At that time the river was in excellent navigable condition for boats drawing not more than 3 feet of water from its mouth to Newport, Ark. From Newport to Batesville there were many troublesome snags, and from Batesville to Buffalo Shoals there were numerous bad shoals. From Buffalo Shoals to Forsythe, Mo., there were many fine reaches of river, but Buffalo Shoals and others prevented any navigation at ordinary stages of water.

The present plan, based on the survey, provides for the maintenance at low water of a channel 2 feet deep between Newport and Buffalo Shoals, and a channel of not less than 5 feet deep at low water from Newport to the mouth, and also for a limited amount of snagging operations while these improvements are in progress. The result between Newport and Buffalo Shoals is to be accomplished by the erection of solid wing dams and some rock excavation. From Newport to the mouth this result is to be accomplished by the erection of low permeable spur dikes, to give the necessary depth of water on the shoals.

By act approved July 13, 1892, $75,000 was appropriated. Up to June 30, 1892, $108,708.04 had been expended, which completed the survey, plotted the notes, published the maps, effectually improved some of the most dangerous shoals between Buffalo Shoals and Newport, Ark., gave much relief to navigation by removing the most dangerous snags from Batesville to the mouth of the river, and made important additions to the plant. During the fiscal year ending June

30, 1893, material was accumulated on the lower White River for the erection of dikes and the plant was increased and repaired.

It is recommended by the engineer in charge that a system of lock and dams be undertaken. The commerce of the river is gradually increasing.

The amount that can be profitably expended in fiscal year ending June 30, 1895, $153,815.

COMMERCE.

There have been great advantages derived from the work done on the river from Batesville to McBee Landing; the channel has been deepened so that boats can make the trip on 6 inches less water than before the work was done, and if continued would do great good, as it would furnish transportation to the vast tonnage that would come down the river; otherwise it has to go overland. Tonnage, 173,964.

OUACHITA AND BLACK RIVERS, ARKANSAS AND LOUISIANA.

The Ouachita River rises in the Ouachita Mountains, Arkansas, flows in a general southeasterly direction through Arkansas and Louisiana until, joined by the Tensas and Little rivers at Trinity, La., it becomes Black River, and, flowing in a southerly direction, enters Red River near its mouth.

The improvement of Ouachita River was begun in 1871, and the Black River was added under the same head of appropriation by the act of 1884.

The project contemplated the removal of wrecks, logs, snags, leaning trees, etc., and the improvement of shoal places between Camden, Ark., and the mouth of the Black River, a distance of 369 miles.

The total amount appropriated to date is $382,500.

The improvements made have greatly benefited navigation, a great number of obstructions having been removed, and the depths on some of the shoal places increased from 12 inches to 3 feet.

In the past fiscal year the snag boat *Wagner* worked over Lower Ouachita and Black rivers, and by the removal of obstructions improved navigation greatly between Monroe, La., and the mouth of Black River. A chopping party worked from Monroe to the Arkansas State line, putting that stretch of river in fairly good condition for navigation at stages when boats can run. The work will be resumed as soon as possible, to remove obstructions brought in by the recent flood.

Since the project for locks and dams was abandoned three examinations have been ordered and made with a view to slack-water navigation, the last in 1889, and the reports on all agree that work should continue under the adopted project until an increase of trade is developed sufficient to justify a large expenditure for permanent improvement.

The amount that can be profitably expended in ensuing fiscal year is $186,500.

Detailed estimates.

For the snag-boat service	$16,000
Expenses of chopping parties	8,000
Repairs and outfit	2,000
Dredging in Black River	2,000
Gauges, leveling, and reconnaissance	5,000
Assistant engineers and draftsmen	2,000
Survey of Ouachita River	150,000
Office expenses, stationery, mileage, and contingencies	1,500

About 25 steamboats are engaged in trade on the Ouachita and Black rivers. The following shows the freight transported for three years past:

COMMERCE.

Articles.	1892–'93.	1891–'92.	1890–'91.
	Tons.	*Tons.*	*Tons.*
Cotton	11,383	21,890	21,433
Cotton seed	4,423	5,577	6,593
Hides and skins	4	7	25
Live stock	845	89	172
Lumber	18,000	461	16,388
Saw logs	28,000	26,880	120,000
Staves	9,378	23,402	17,888
Rock	----------	----------	18,000
Miscellaenous	5,251	5,197	10,856
Total down freight	77,284	83,503	211,355
Return freight	11,157	18,317	27,842
Total	88,441	101,820	239,197
Estimated value	$4,466,000	$6,680,600	$9,130,000

In addition to the above, the commerce of Little River, which unites with the Ouachita and Tensas in forming Black River, was, for 1891, 69,338 tons of freight, valued at $705,000.

RED RIVER ABOVE FULTON, ARK.

The project for this improvement, adopted in 1886, contemplated removing snags, drift, overhanging trees, etc., above Fulton to the mouth of Kiamichi River, 138 miles, to give reasonably safe navigation at high and medium stages.

The amount expended to June 30, 1892, was $11,779.26, with which a small hand-propelled snag boat was built and employed in the fiscal years 1888 and 1889 in removing obstructions. In the fiscal year 1891 the snag boat was sold to the work of improving Red River, Louisiana and Arkansas, for $1,500, and the proceeds of the sale, with the appropriation of 1890, were applied to going over the work and removing snags, drift, and leaning trees, practically completing the project for safe navigation at high stages.

During the past year work was carried from Fulton to the mouth of Kiamichi River, and consisted of clearing a safe low-water channel for the passage of the snag boat, which will widen and scour, that being all that could be done with the amount available.

Unless a single appropriation of $10,000 is granted for this part of Red River, to permit the systematic clearing of the banks and channel without interruption, no further work is recommended for the present. This amount could be expended advantageously for clearing banks of caving and sliding trees, to stop accumulations of drift, and in conti uing the removal of sunken logs to permit the bottom to scour, and such work would benefit navigation below Fulton also by lessening the source of drift.

The value of the annual commerce is about $265,000.

CURRENT RIVER, ARKANSAS.

An examination of this river from Van Buren to its mouth was made in 1890 and was considered worthy of improvement. The last river and harbor act ordered another survey.

It appears that there are 95 miles of this river from the mouth to Van Buren that are navigable throughout the whole year, as there is an abundance of water. The discharge at Van Buren at a low-water stage is 2,200 cubic feet per second. About 4 miles below this point is a large spring, which affords about 700 cubic feet more. The average width at low-water stage is 200 feet and the velocity 2.75 miles per hour. The flood oscillation is about 16 feet. The Current River at time of floods is very swift, and has a tendency to clear the channel of obstructions in the way of snags, though many large clay-filled roots, too obstinate to be moved in this way, are lodged in the channel and make serious obstructions to navigation. Other obstructions in the way of shoals may be readily improved by a system of wing dams, built of rock and willow brush, for the purpose of contracting the channel.

This style of wing dam has been successfully operated on Upper White River.

The commerce demanding the improvement of this river is approximately estimated to be 140,000 tons of lumber per annum in Carter County, Mo., besides 21 sections of undeveloped mineral lands (iron and lead), of which I have specimens now in my office that will compare favorably with the ores of Iron Mountain and De Loze lead mines, Missouri.

Van Buren alone, the county seat of Carter County, exports 800 car loads of lumber annually, and the town of Grandin, 5 miles from the river, 2,500 cars per annum, besides millions of feet which are floated down the river to other markets, and which estimates, it is believed, would be trebled if the river could be safely navigated.

In Ripley County 45,000 or 50,000 tons of lumber, 5,000 bales of cotton, and over 300 car loads of merchandise received. From the State line to the mouth in Arkansas over 40,000 tons of lumber, 4,000 bales of cotton, besides grain and merchandise.

In view of the large amount of commerce and the great number of people to be benefited, it is recommended that the following amount be appropriated:

For building and equipping one small hand-propelled snag-boat	$4,000
For running expenses of this boat four months	3,750
For building of wing dams	710
For one rock-barge	350
For contingent expenses	1,190
Total	10,000

CLINCH RIVER, TENNESSEE.

The Clinch River rises in southwestern Virginia, and after a course of about 400 miles enters the Tennessee River at Kingston, Tenn., 110 miles above Chattanooga.

The present project has for its object the obtaining of a safe channel, at ordinary low water, of 2 feet depth from the mouth of the river to Clinton, 70 miles, and of 1½ feet from Clinton to Walkers Ferry. This is to be accomplished by building wing dams to contract the water way, reducing ledges and bars, and removing surface obstructions.

From Walkers Ferry to the Tennessee State line, 85 miles, it is proposed only to remove surface obstructions sufficiently to accommodate

the flatboats and rafts during the sudden rises common in the season of navigation.

The engineer officer in charge reports that $50,000, the estimate of 1885, is wholly inadequate to do the work projected, and recommends that a detailed survey be made to obtain the data necessary to determine the cost.

The total amount expended to the close of the fiscal year ending June 30, 1892, including outstanding indebtedness, was $34,962.29, and has resulted in securing a reduction of the rock reefs, the removal of snags, drift, etc., brought down by the annual floods, and the construction of several heavy riprap dams above and below Haynes; a safe channel was secured at stages of the water from 2 to 3 feet lower than before the improvements were begun. Special advantages in the lower river have been gained at Cloud Shoals, Hibb Shoals, Black Shoals, Bletcher Shoals, and at Llewellyn Shoals. At the last named obstruction safe navigation is reported possible at a stage of water from 1 foot to 1½ feet lower than before the work of 1892 was begun. Some improvements were also made in 1892 in the channel at Youngs Island. Above Haynes improvements were made at Hunter Shoals, Sycamore Shoals, Hopson Shoals, and Straight Shoals.

The amount (estimated) required to complete existing project $11,000; which amount could be expended to advantage in ensuing fiscal year.

COMMERCE.

The amount of tonnage annually is 25,000 tons.

The principal navigation at present consists of logs and zinc ore. Immense tracts of uncut timber still remain in the country adjacent to this stream, and will for a long time to come require a channel as a means of transportation. The products of the zinc mines are still brought down in flatboats to the reducing works at Clinton. These ore deposits are reported as being very extensive and practically dependent upon the river for transportation.

CUMBERLAND RIVER, TENNESSEE, AND KENTUCKY, ABOVE NASHVILLE.

The Cumberland River is navigable to Point Burnside, Ky., 337 miles, by steamboats drawing 3 feet of water, from four to six months in each year, and for boats of greater draft from two to three months.

The appropriations for the upper section from 1876 to 1884, amounting to $346,000, were expended in clearing the channel of snags and other surface obstructions, excavation at worst shoals, with use of wing dams, and resulted in an increased depth at several of the principal obstructions, giving a safer and longer period of navigation.

In 1883 an instrumental survey of the river was made with a view to its radical improvement by a system of locks and dams from Nashville to Smiths Shoals, a distance of 337 miles. This canalization project was shortly afterwards adopted and has since been in force, the appropriations of 1884, 1886, 1888, and 1890 having been expended under its provisions. When adopted the estimate for completing this project was $4,077,922, but locks of larger dimensions than those contemplated in the original project and estimates therefor having been recommended by the Board of Engineers and approved by the Chief of Engineers and Secretary of War, it has become necessary to revise these original esti-

mates. Plans and estimates for Locks No. 1 and 2 have been prepared and contracts for portions of the work have been made, from which it is now estimated that each lock and dam will cost not less than $250,000. An estimate of the section from Nashville to Point Burnside, provided 23 locks be found necessary, amounts to $5,750,000, and to continue the improvement to the head of Smiths Shoals, with 7 additional locks and dams of equal cost, would amount to $1,750,000 more, or a total of $7,500,000, an increase of the original estimate by $3,422,078. By increasing the lift of the locks, however, it may be found possible to decrease their number and thus complete the improvement at a reduced cost.

The act of August 5, 1886, appropriating $75,000, specifically provided for this work of canalization "with a view to secure in the channel a depth of 4 feet, commencing with the lock at or near the lower island at Nashville," and was followed by the appropriations of August 11, 1888, $200,000, and of September 19, 1890, $250,000, and July 13, 1892, $250,000.

The amount expended to June 30, 1892, including outstanding indebtedness, was $143,039.26. This expenditure has been applied to the purchase of sites of locks, in the building of locks and dams, repairing snagboat, and removing obstructions. During the past fiscal year work has been carried on on the locks, dams, and surveys.

The amount expended was $119,294.17.

Amount required for completion of existing project, $6,725,000. Amount that can be profitably expended in fiscal year ending June 30, 1895, $1,000,000.

COMMERCE.

Cumberland River above Nashville, Tenn., from July 1, 1892, to June 30, 1893.

Articles.	Tons.	Articles.	Tons.	Articles.	Tons.
Sand	38,300	Flour	1,588	Sheep	31
Logs	19,000	Tobacco	1,345	Shingles	52
Lumber	10,022	Hogs	1,251	Iron	10
Grain	3,372	Bricks	1,550	General merchandise	16,550
Staves	2,000	Cross-ties	300		
Salt	1,701	Coal	350	Total	100,764
Cattle	1,605	Hay	69		
Wood	1,600	Horses and mules	69		

Number of passengers, 6,775.

Cumberland River above Nashville, Tenn., above Burnside-Smith Shoals, from July 1, 1892, to June 30, 1893.

Articles.	Tons.	Articles.	Tons.
Logs	18,000	Staves	30
Cross-ties	12,000		
Coal	2,440	Total	42,470

For steamboats drawing not more than 3 feet the Cumberland River is navigable four to six months in each year to Point Burnside, Ky., and for boats of greater draft from two to three months. To Carthage (mouth of Caney Fork), 118 miles, the river is navigable for steamboats of 2½ feet draft from six to eight months, and for those of greater draft

four to five months. Steamboats of light draft can ascend to Burksville (238 miles) for from five to seven months and large boats four or five months.

CUMBERLAND RIVER, TENNESSEE AND KENTUCKY, BELOW NASHVILLE.

The present project for improving this portion of the river is based on an examination made in 1871. The obstructions were found to be of the same general character throughout, consisting of rock reefs, sand and gravel bars, bowlders, snags and overhanging trees, and other surface obstructions. This project comprises the deepening of the channel by excavation and the use of wing dams; the removal of snags and surface obstructions, and the modifying of the channel in the Kentucky Chute of the Ohio, at the mouth of the Cumberland, by the construction of a pile dike with crib superstructure.

A survey was made in 1889, having in view a project for the radical improvement of the river below Nashville, and "to ascertain if necessary to establish locks and dams." The river and harbor act of July 13, 1892, provided for the selection and purchase of sites for a lock and dam near the mouth of Harpeth River. The total amount expended to June 30, 1892, including outstanding indebtedness, was $287,694.70. This expenditure has resulted in obtaining an increased depth at low water at some of the worst obstructions and thereby securing a lengthened season of navigation, and from year to year in clearing the channel of snags and other surface obstructions. Good progress was made on the work of building dike and stone protection at mouth of river under contract. The old spur dams were shortened so as to increase the channel width. The shore of Cumberland Island in the vicinity was protected by riprap. Buoys or floats were placed on the dams at the principal obstructions to mark location of dams at high water.

During the present fiscal year the work of dike construction was continued at mouth of the river; the old dams extending from Cumberland Island to head of dike were entirely removed.

The expenditures amounted to $25,542.31.

The site for the lock and dam near mouth of Harpeth River has been selected and approved by the Secretary of War.

The amount (estimated) required to complete existing project, $153,000; this entire amount can be profitably expended in fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

Cumberland River below Nashville, Tenn., from July 1, 1892, to June 30, 1893.

Articles.	Tons.	Articles.	Tons.	Articles.	Tons.
Logs	40,000	Stone	5,450	Hay	691
Iron	29,934	Tobacco	5,056	Salt	617
Grain	18,715	Bricks	3,205	Coal	538
Wood	11,000	Horses and mules	2,037	Shingles	131
Sand	8,400	Hogs	1,400	Hoop poles	101
Staves	6,975	Cattle	791	Cotton	1
Lumber	6,037	Flour	750	General merchandise.	21,043

Number of passengers, 11,906.

FRENCH BROAD RIVER, TENNESSEE.

This river unites with the Holston about 5 miles above Knoxville, thus forming the Tennessee. An examination in 1875 showed the obstructions to consist of ledges, gravel bars, bowlders, snags, drift, etc.

The present project is to remove surface obstructions, reduce ledges and bars, build wing dams to contract the waterway where necessary, so as to obtain a channel depth of 2½ feet at ordinary low water to Leadvale, about 90 miles from the mouth of the river.

The amount expended to June 30, 1892, including outstanding indebtedness, was $47,984.24. This expenditure has resulted in the improvement of ten of the principal obstructions below Dandridge, by deepening and clearing the channel, constructing and modifying wing dams, and revetting the banks where necessary. At Seven Island Shoals the improvements have made upsteam navigation possible at lower stages of the river. A general deepening of the channel from 6 to 10 inches has been obtained. At Bryant Shoals navigation has been greatly improved; at Hanging Rock Shoals the channel has been changed from the north to the south side of Brabson Island, and the new channel was cleared of obstructions without detention of boats; eight dams were built, aggregating a length of 2,694 linear feet. The work done has proved effective.

The amount expended, including outstanding indebtedness, during the fiscal year, was $4,712.87. The work done and projected will materially aid navigation and the development of the mining and agricultural interests along the valley of the river.

No work has been done on the bar in Little Pigeon River.

The amount (estimated) required to complete the existing project, $88,000; amount that can be profitably expended in ensuing fiscal year, $30,000.

COMMERCE.

The completion of the existing project of improvement will materially aid in the development of the mines and will open a river highway for the transportation of the mineral wealth of the mountains and the products of the rich agricultural lands of the region drained by the river and its tributaries.

Six steamboats plied this river in 1893, carrying 12,500 tons of freight and 6,940 passengers.

TENNESSEE RIVER, BELOW CHATTANOOGA, TENN.

When this section of the river was examined in 1867 it was found that the reach between Chattanooga and Browns Ferry was obstructed by reefs and bars, and had about 3 feet of water in the channel for eight or nine months in the year. Between Browns Ferry and Florence the Muscle Shoals formed a complete barrier to navigation. From Florence to the mouth, near Paducah, Ky., on the Ohio River, there were many shoals and other obstructions. The distance from Chattanooga to the mouth is 456 miles.

The present project of improvement may be divided into four distinct items, as follows:

(*a*) Removing obstructions by blasting and dredging in "The Suck" and at Bridgeport and Guntersville, Ala.

(*b*) Building a canal 14.5 miles long, 70 to 120 feet wide, and 6 feet deep around the Big Muscle Shoals, having 9 locks, each 60 by 300 feet, and an aqueduct over Shoal Creek 900 feet long and 60 feet wide; constructing a canal 1.5 miles long with 2 locks around Elk River Shoals.

(*c*) Blasting a channel through bed rock and building wing dams at Little Muscle Shoals. As modified in 1890 the project contemplates the building of a canal along the south bank 3 miles long with 2 locks.

(*d*) Constructing a canal 7.8 miles long, 150 feet wide, and 7 feet deep around Colbert and Big Tree Shoals, with a combined lock at lower end and guard lock at the head; size of locks, 80 by 350 feet.

"*The Suck*" is the name commonly applied to the several rapids and shoals where the river winds in a tortuous route through the mountains below Chattanooga, covering a distance of $8\frac{1}{2}$ miles, in which the fall is $16\frac{1}{2}$ feet. The obstructions, separated by pools, are known as Tumbling Shoals, the Suck, the Pot, the Skillet, and the Pan, and are formed by rock reefs and bowlders and by protruding rocky points from both shores, which contract the waterway.

The total amount expended to June 30, 1892, including outstanding liabilities, was $3,556,529.70, and resulted in the improvement of the river as follows:

Navigation through "The Sluck" and the Pan was rendered easier by the removal of bowlders, detached rock, overhanging trees, and projecting rocky points. At Elk River and Big Muscle Shoals the locks, gates, valves, and machinery for properly operating them were completed; the aqueduct and permanent stone dams finished; houses for lock-keepers and assistants, a dredge and towboat for use of the canal built, and the canal opened to navigation the year round. At Little Muscle Shoals the channel was deepened by blasting, and wing dams built in accordance with the original project, giving increased depth. At Colbert and Bee Tree Shoals increased depth was obtained by excavating a channel and contracting the waterway by means of riprap dams; survey of location for proposed lateral canal was completed and center line permanently marked by stone monuments.

The amount expended during the fiscal year, including outstanding liabilities, was $167,422.41, for which the following work was done:

The channels through Tumbling Shoals, Poor Horse, and Broad Ax bars were straightened and deepened. At Ross Towhead and Guntersville the channel was deepened. The gap in Beards Reef was cleared of obstructions. The locks and dams on the canal were repaired during the fiscal year.

Florence, Ala., to foot of Bee Tree Shoals.—The test pits and examinations needed to determine the nature of foundation for the lock were completed. By a modification of the project it is proposed to substitute a single lock of 25-foot lift for the two locks contemplated in the modified project of 1891.

Amount (estimated) required to complete existing project, $5,837,939.81. Amount that can be profitably expended in ensuing fiscal year, $2,130,000. One hundred and thirty thousand dollars of this is estimated as required to complete the improvement at Livingston Point, Ky.

COMMERCIAL STATISTICS.

Articles.	Year ending June 30—		Articles.	Year ending June 30—	
	1892.	1893.		1892.	1893.
Between Chattanooga, Tenn., and Decatur, Ala.			*Between Florence, Ala., and Paducah, Ky.*		
	Tons.	*Tons.*		*Tons.*	*Tons.*
Lumber	3,113	58,525	Iron	6,970	14,454
Cotton	3,038	190	Staves	3,986	4,141
Live stock	621	197	Lumber	24,742	104,000
Grain	7,396	1,798	Cotton	6,105	1,837
Flour	1,054	342	Peanuts	4,649	2,029
Cotton seed	285	24	Live stock	2,189	3,090
General merchandise	10,036	5,578	Hoop poles	5,699	124
Logs and wood	45,755	6,090	Grain	18 249	12,121
Iron	2,250	4,581	Flour	6,073	4,352
Staves	5,272	.....	Cotton seed	995	24
			Sand	2,353	701
Total	78,820	77,325	General merchandise	36,114	28,177
			Logs	71,336	30,300
			Railroad ties	46,749	139,203
			Total	236,209	344,553

About 25 steamboats carry on the above trade.

COMMERCE.

Commerce of Tennessee River above Chattanooga, Tenn., from July 1, 1892, to June 30, 1893.

Articles.	Tons.	Articles.	Tons.
Coal	9,900	Lumber	102
Iron ore	13,365	Shucks	95
Grain	6,939	Eggs	26
Sand	5,150	Chickens	13
Tan bark	412	Guano	12
Hay	739	Cotton seed	6
Flour	271	Butter	4
Pease	260	Beans	2
Cattle	226	General merchandise	3,396
Salt	162	Logs	50,000
Straw	107		

TENNESSEE RIVER ABOVE CHATTANOOGA, TENN.

As one of the largest of the forty-three or more tributaries of the Mississippi River, the Tennessee has always held an important place in the projects for the improvement of the navigable waterways of the country. The Muscle Shoals Canal having been opened to navigation in November, 1890, the Tennessee River is now navigable from its source to its mouth, a distance of 650 miles, during several months of each year, and as work is continued upon certain other less formidable obstructions the season of navigation will be correspondingly lengthened.

The upper section of the river is navigable during medium and high stages, which usually prevail through the winter and spring months, and occasionally at other seasons during the occurrence of so-called rain tides.

The navigation consists of steamboats carrying freight and passengers, flatboats bringing products from the upper tributaries, and rafts of logs and lumber, also brought from the tributaries, the latter constituting the major part of the commerce of this river.

Examinations were made in 1830 and 1871, and a detailed instrumental survey in 1891–'93. The obstructions were described as "low-water obstructions," consisting of reefs, rock or gravel bars, and snags, etc., brought down by freshets. The depth on these bars varies from 10 to 30 inches at a low-water stage, the current being from $2\frac{1}{2}$ to 6 miles per hour.

The original project, under which the work is still carried on, was to blast a channel through the reefs, reduce the gravel and sand bars, and to deepen the water on the bars by the construction of wing dams, thus contracting the waterway so as to secure a safe, navigable channel, 3 feet in depth at average low water.

The amount expended to June 30, 1892, including outstanding indebtedness, was $269,303.10, which expenditure has resulted in securing a lengthened season of navigation for steamboats and a safer channel for the passage of rafts and flatboats. Of the 43 obstructions enumerated in 1830, channel work has been carried on to the extent of improving at least 29 of them. Owing to the character of the banks these improvements are practically permanent. At White Creek Shoals the longitudinal dam has been lengthened and two spur dams built, causing the removal of the sand bar to deep water. At Soddy Shoals the channel has been carefully examined and preparations made for drilling and blasting the rock forming the dangerous reefs of this obstruction. Three dams have also been repaired.

At Soddy Shoals work was carried on for about four months, August to December, removing from the channel about 650 cubic yards of rock, 145 snags, and 267 overhanging trees; 4,052 cubic yards of dam was built and 1,496 cubic yards of old dam calked. During the winter the fleet was moored at Chattanooga. In April the fleet was moved to Caney Creek Shoals and the quarrying stone for the dams was begun; this work was in progress at the close of the fiscal year.

The amount expended, including outstanding indebtedness during the fiscal year ending June 30, 1893, was $22,786.98.

The amount (estimated) required to complete the existing project is $44,000; this entire amount can be profitably expended in ensuing fiscal year.

OBION RIVER, TENNESSEE.

This river is a tributary of the Mississippi, rising in the western part of Tennessee, its navigable portion lying wholly in Obion and Dyer counties. From the bridge of the Newport News and Mississippi Valley Railroad to the Mississippi it has a length of 69 miles and a fall of 27 feet. The course of the Obion is through a low, alluvial, and well-timbered country, subject to overflow, due in a great measure to backwater from the Mississippi. It has a width varying from 80 to 200 feet and a depth generally of over 5 feet at low water, except at certain shoals, where in some places a depth of but 18 inches was found. The shoals are usually caused by obstructing driftwood, which holds sediment in place, and it is thought that the removal of the drift will, in nearly all cases, cause the disappearance of the shoals. In addition to the shoals and drift above mentioned the river is also obstructed by snags and overhanging trees.

The project consists of removing surface obstructions, constructing wing dams at the worst shoals, straightening the channel by cutting through several sharp "bends," making the "cut-offs" sufficiently wide and deep by clearing, grubbing, and excavating, closing the old channel by means of pile and brush dams, to secure a navigable channel not less than 3 feet deep at lowest stages, estimated to cost $50,000.

The appropriation of $7,500 in river and harbor act of July 13, 1892, was the first made for this work by the General Government.

In October boats were built and work begun. The channel was cleared of surface obstructions from Obion to Lane Ferry, about 22 miles. Work was suspended by high water in December. In March operations were resumed by clearing away the snags that could not be reached during the first season's work. The drift gorges that completely closed the channel at several points were cut through. A small steamer, with barges in tow, passed up the Obion in May, being the first steamboat reaching that town during the past fifty years. It is reported that the work done has given great satisfaction to the river interests.

The amount (estimated) required to complete the existing project, $42,500. Amount that can be profitably expended in fiscal year ending June 30, 1895, $10,000.

COMMERCIAL STATISTICS.

Obion River, Tennessee, from July 1, 1892, to June 30, 1893.

Lumber ..... tons.. 16,200

This commerce represents the tonnage brought up the river to Obion from a point about 23 miles below, and rendered possible only by the improvements made during the present fiscal year.

KENTUCKY RIVER, KENTUCKY.

The Kentucky River is a tributary of the Ohio, emptying into it at Carrollton, Ky., about midway between Cincinnati and Louisville. This river is formed by the north and south forks, which rise in the Cumberland Mountains and unite at Proctor, Ky. It runs in a generally northwestward direction, and traverses a beautiful and fertile country. Steamboats can ascend it as far as Frankfort, the capital of the State. Large amounts of freight, of which an important item is coal, brought from the vast deposits lying in the hills of the Three Forks, are carried on the river during high stages in flatboats.

COMMERCE.

Articles.	1890.	1891.	1892.	1893.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Beer	.....	.....	345	325
Brick	.....	.....	130	771
Coal	89,562	89,752	203,224	176,871
Cement	.....	.....	200	212
Cooperage	.....	.....	736	1,116
Cross-ties	.....	.....	1,445	889
Grain	6,991	14,279	10,219	725
Flour	1,503	1,744	6,233	12,094
Hay	4,407	500	6,486	5,120
Iron	1,903	712	4,292	5,671
Live stock	2,350	3,065	2,506	493
Logs	158,903	224,844	72,749	2,071
Lumber	10,670	15,256	13,336	63,197
Merchandise, miscellaneous	19,554	21,739	60,618	28,156
Salt	909	1,602	9,025	4,276
Timber	4,682	3,761	21,831	3,131
Tobacco	2,783	5,636	11,199	5,808
Whisky	4,142	4,306	4,098	3,263
Passengers	1,995	2,023	3,172	3,176
Total	310,354	389,219	431,846	330,449

The condition of the river when the United States assumed charge of its improvements was as follows: The five locks and dams, with their approaches, built by the State of Kentucky, were in a dilapidated condition, and the channel was much obstructed by snags and leaning trees.

The project for the improvement, adopted in 1879, called for the necessary repairs to the five locks and dams, and the extension of slack-water navigation for a draft of 6 feet, by the construction of additional locks and dams to Beattyville, a distance of 261 miles from the mouth of the river.

Up to the close of the fiscal year ending June 30, 1892, $1,344,017.84 had been expended, resulting in the restoring of the locks and dams to a navigable condition, clearing the channel and banks of obstructions, and the partial completion of a new lock, known as No. 6 of the system.

The amount expended during the fiscal year ending June 30, 1893, was $47,584.49, and resulted in continuing the work at Lock and Dam No. 6, and in examinations for the location of Lock No. 7, near Twin Ripple.

The amount (estimated) required to complete the existing project is $1,524,000. Amount that can be profitably expended in ensuing fiscal year, $500,000.

FALLS OF THE OHIO RIVER, LOUISVILLE, KY.

This work under the present project, adopted in 1883, is carried on in two divisions—the enlargement of the upper portion of the Louisville and Portland Canal and the enlarging of canal basin.

Enlargement of the upper portion of the Louisville and Portland Canal.—The present project was adopted in 1883 and modified in 1890, at which time the estimated cost of completing the work recommended by the Board of Engineers was $710,230.40. It includes a large amount of rock excavation, whereby the canal will be widened to more than double its former width for a length of some 2,400 feet, and a capacious basin or harbor, with a width of 800 feet and length of about 2,200 feet, will be formed in advance of the entrance to the canal. Masonry walls and dams, aggregating 5,850 feet in length, are to close the enlarged canal and basin on the river side. The work is being done by hired labor, with machinery owned by the Government. The work done to June 30, 1893, comprised 174,245.03 cubic yards rock, 212,019.31 cubic yards earth excavation, and 13,678.83 cubic yards of masonry in new canal wall, of which 13,362.63 cubic yards rock and 34,486.50 cubic yards earth were excavated and 3,371.27 cubic yards of masonry laid during the fiscal year ending on that date.

The enlargement above the locks was begun in 1887 with the object of constructing a basin 1,500 feet long and 250 feet wide, where boats can tie up and tows be properly formed before or after passing the locks without obstructing navigation through the canal. The work is nearly completed, the results accomplished to June 30, 1893, being 17,744,60 cubic yards rock and 141,593 cubic yards earth excavation and 5,807 cubic yards masonry laid in new wall.

The total expenditure on these improvements to June 30, 1893, was $716,951.17, of which $98,261.74 was expended in the fiscal year ending on that date.

Owing to the small amount of the appropriations for this work heretofore, commerce has not been greatly benefited and the cost of work has been increased.

The amount (estimated) required to complete the existing project is $550,008.89. Amount that can be expended to advantage in fiscal year ending June 30, 1895, is $300,000.

COMMERCIAL STATISTICS.

Statement of commerce passing the Falls of the Ohio River via Louisville and Portland Canal and Indiana Chute, from June 30, 1887, to June 30, 1893.

Articles.	From 1887 to 1892.	From 1892 to 1893.	Total for seven years.
	Tons.	*Tons.*	*Tons.*
Coal	10,387.851	826,876	11,214,727
Salt	71,623	8,362	79,985
Oil	47,662	2,024	49,686
Whisky	14,803	1,630	16,433
Tobacco	60,350	4,415	64,765
Cotton	76,261	2,874	79,135
Lumber	2,908,562	9,872	2,918,434
Corn and wheat	61,363	14,866	76,229
Iron ore	270,904	.....	270,904
Iron	132,005	.....	132,005
Steel rails	251,080	19,992	271,072
Produce	43,148	8,709	51,857
Hay and straw	124,832	7,971	132,803
Flour	9,652	870	10,522
Stock	48,237	6,904	55,141
Sugar and molasses	49,394	5,943	55,337
Staves and shingles	219,259	45,256	264,515
Cement	17,574	3,274	20,848
Miscellaneous	424,157	113,179	537,336
Total	15,218,717	1,083,017	16,301,734

Annual average during past seven years, 2,328,819.

INDIANA CHUTE, FALLS OF THE OHIO RIVER.

This is the main channel of the river over the Falls of the Ohio. Originally it was very crooked, with most irregular rock bottom, and swift, whirling currents. By removing the most prominent rocky projections it has been so improved that a large part of the river traffic can now descend by that route when the stage of water is up to, or above, 10 feet on the upper canal gauge. In 1890 a project for its more radical improvement was adopted, the object being to make it safely navigable when the river is not below a stage of 8 feet on the canal gauge. Commerce will be thereby relieved at such times from the delays incident to passing the falls via the Louisville and Portland Canal and locks, an advantage which will be of the greatest importance to the heavy coal traffic, which alone amounts to about 1,700,000 tons annually. Nearly all this traffic would then follow the improved Indiana Chute, as the shipments of coal, when the river is at a lower stage than 8 feet, are exceedingly small.

During the past year good progress was made on this work, 27,586.62 cubic yards of solid rock having been excavated and 1,864 linear feet of stone dikes built.

The amount expended on the improvement of this chute to June 30, 1893, is $187,858.45.

The amount (estimated) required to complete the existing project is $57,250. Amount that can be profitably expended in ensuing fiscal year, $57,250.

ROUGH RIVER, KENTUCKY.

The Rough River, formerly known as Rough Creek, is one of the principal tributaries of the Green River, and drains a large portion of

Hardin, Breckinridge, Grayson, and Ohio counties in the State of Kentucky. It flows westward in an exceedingly tortuous course, and is about 96 miles in length from its forks to the Green River. Its width varies from 100 to 200 feet. The channel is shoal in low water and obstructed by bars or ripples.

At present, as the periods of high water are uncertain, and consequently the few trips that it is possible for steamers to make are very irregular, the majority of the products are carried to the railroad for shipment. The expense of hauling them so great a distance and the high charges for transportation by rail have been a serious obstacle to the prosperity of this section.

The river was very much obstructed at the time work on it was commenced, and, being narrow and very crooked, some of the bends were almost filled with snags, sunken timber, and logs, while overhanging trees on the banks constituted a still further obstruction to steamboats.

The project for this improvement was approved October 27, 1890, and provides as follows: First. To definitely locate the site of the lock proposed, and purchase or have condemned the land needed about the lock and abutment. Second. Clear the river of obstructions, to wit: Overhanging trees on the banks, and snags, logs, and stumps in the bed of the river. The estimate for this was $300 per mile, or $9,000 for the 30 miles between the mouth of the river and Hartford.

The amount of money expended to June 30, 1892, was $5,832.04, and resulted in a survey for the site of lock and preparing plans for the lock, dam, etc.; the removal of obstructions throughout the length of the stream from its mouth to Hartford, in the river, and the deadening of trees on the banks for the same distance.

The amount expended during the fiscal year ending June 30, 1893, was $1,187.94, and resulted in the purchasing of the necessary lands at the lock site, the running of a line of levels from Lock No. 2 to the site of the proposed lock, and in the preparation of plans for the lock and dam.

The amount (estimated) to complete the existing project, $65,556. This entire amount can be expended to advantage in ensusing fiscal year.

COMMERCE.

Articles.	1891.	1892.	1893.
	Tons.	*Tons.*	*Tons.*
Logs	89,161	.....	.....
Lumber	9,000	.....	.....
Timber, logs, etc	.....	50,000	75,000
Total	98,000	50,000	75,000

LEVISA FORK OF BIG SANDY RIVER, KENTUCKY.

The Levisa is the western of the two forks that unite at Louisa to form the Big Sandy River. It rises in the southwestern part of Virginia, at an elevation of about 1,500 feet above tide water, and flows in a northerly direction. Its banks in many cases are rocky, in others composed of sand and clay. It possesses all the characteristics of a mountain stream, a steep average slope, and pools of varying depth, separated by rocky bars or ripples that at low water often had but a

few inches of water over them. The average fall from Pikeville to Louisa is 1.49 feet per mile, the distance being 86½ miles.

The object of the improvement has been to facilitate rafting and push-boat navigation in the upper river, and to improve low-water steamboat navigation so far as this can be done. Steamboats can not run in this or Tug Fork at dead low water, but the work done so far has been of such a character as to permit of their running on smaller rises than was the case before the improvement was commenced.

Coal mines have been opened at and near Peach Orchard and quite extensive shipments are made by rail to Ashland, on the Ohio, where it is put in barges for transportation down that river. Could coal be shipped out by water from the mines, the output of coal would be largely increased.

The stream under the present project is incapable of permanent improvement, as the obstructions to navigation, such as snags, stumps, logs, etc., are liable to reform at any time, and an annual appropriation of about $2,500 is needed to keep it clear.

The present project was adopted in 1890 and provides for the removal of snags, logs, stumps, rocks, etc., from the river and overhanging trees on the banks.

The amount expended to June 30, 1892, was $20,730.14, and resulted in the material improvement of navigation, by the removal of obstructions, giving increased facilities for push-boat navigation at low water, and rafting and light-draft steamboat navigation at moderate stages.

The amount expended during the fiscal year ending June 30, 1893, was $1,645.96, and resulted in the further removal of snags, rocks, logs, and stumps from the river bed.

Amount that can be profitably expended in fiscal year ending June 30, 1895, $2,500.

TUG FORK OF BIG SANDY RIVER, WEST VIRGINIA AND KENTUCKY

The Tug Fork is the eastern of the two forks which unite at the town of Louisa, 26 miles from the Ohio, to form the Big Sandy River. It rises in the southwest corner of West Virginia and flows toward the northwest for a distance of 140 miles. For a distance of 18 miles at its head it forms a part of the boundary between Virginia and West Virginia, and below this it and the Big Sandy form the boundary between West Virginia and Kentucky. Throughout most of its length it is a characteristic mountain stream formed of a series of pools separated by ripples.

The object of the improvement has been to facilitate rafting of logs from the upper portion of the stream and its branches, to provide a low-water push-boat channel, and to make it possible for light-draft steamboats to run at lower stages than formerly while the river was in an unimproved state.

This stream was originally much obstructed by rocks, logs, and overhanging trees. Its improvement has been in progress since work on the Big Sandy was commenced under the project for the improvement of that stream.

The present project was adopted in 1890 and provides for the removal of snags, logs, stumps, rocks, etc., from the river and overhanging trees on the banks.

The amount expended to June 30, 1892, was $20,598.66, and has resulted in the material improvement of navigation, giving increased

facilities for push boats at low water, and rafting and light-draft steamboats at moderate stages.

The improvement has been carried to a point 100 miles above Louisa.

The amount expended during the fiscal year ending June 30, 1893, was $1,818.33, and resulted in the general improvement of the lower part of the stream. The upper 22 miles, improved, has been very much obstructed in recent years by the construction of the Norfolk and Western Railroad, rocks, stumps, and trees having been blasted and thrown into the stream in preparing the roadbed of that road. It is claimed by the railroad people that these obstructions have been removed, but this fact can only be determined by an examination at low water.

The amount that can be profitably expended in ensuing fiscal year, $2,500.

GREEN RIVER, KENTUCKY, ABOVE THE MOUTH OF BIG BARREN RIVER.

The river and harbor act of 1890 contained the following item:

Green River, Kentucky, above the mouth of Big Barren River, completing survey with a view of extending slack-water navigation on Green River.

In the report of the survey the river is recommended as worthy of improvement to Mammoth Cave. The proposed project contemplates the construction of two locks and dams, so as to extend slack-water navigation to Mammoth Cave, at an estimated cost of $361,346.40.

The river and harbor act of July 13, 1892, appropriated $50,000 toward the construction of Lock No. 5, the project for which provides for the location and construction of a lock and dam at the head of slack-water navigation on the river.

The amount expended to June 30, 1893, was $596.02, and resulted in a contingent selection of site near Honakers Ferry, about 12 miles above the mouth of Big Barren River.

The amount (estimated) required to complete existing project, $130,673. This entire amount can be profitably expended in ensuing fiscal year.

COMMERCE.

The amount of freight passing over the Green and Barren rivers in 1893 was 614,373 tons.

RECONSTRUCTION OF LOCK NO. 2, GREEN RIVER, AT RUMSEY, KY.

REBUILDING LOCK NO. 2.

In the deficiency act of March 3, 1893, an appropriation of $65,000 was made for rebuilding Lock No. 2, Green River. A project and estimate for the expenditure of this amount was submitted under date of March 23, 1893, and approved April 12, 1893.

As the amount appropriated is insufficient to complete the lock, it is proposed to build the upper end this season and replace the dam so as to make everything safe, and then, when sufficient money has been appropriated, to complete the whole work.

If possible, navigation will not be interrupted, as the new lock will be located on the river side of the old one. But it is doubtful if the head of the old river wall will stand when the support of the dam is withdrawn; should this turn out to be true, then navigation will have to be closed at this point until the new lock is completed. As it would be

difficult to construct a cofferdam against a head of 14 feet, in addition to the natural head in the lower pool, it is proposed to construct an auxiliary dam above, or part of the old dam, so as to gain sufficient distance upstream for the head of the lock and the coffer surrounding it. In this way the latter will be entirely in the lower pool.

On account of high water but little has been done so far this year beyond making the necessary preparations for commencing work. The estimated cost of this improvement is $170,000, and with the balance of the estimate, $105,000, it can be completed in one season.

COMMERCIAL STATISTICS.

Green and Barren rivers, Kentucky, for fiscal year ending June 30 18

Articles.	1890.	1891.	1892.	1893.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Barrels, empty	55	52	1,268	650
Beer	1,245	222	92	61
Cement	168	600	83	37
Coal	45,904	49,000	71,431	70,060
Flour	773	1,363	1,540	1,813
Grain	1,431	1,284	2,956	3,454
Handles	227	6,144	605	286
Hay	219	427	1,106	439
Hides	19	30	233	48
Hoop poles	278	770	4,342	1,329
Iron, manufactured	98	253	186	4
Live stock	482	1,285	2,056	2,658
Lumber	2,866	9,000	14,504	14,548
Merchandise	8,933	16,420	13,093	9,992
Produce	501	184	384	242
Salt	1,014	1,104	1,376	1,331
Stone	788	14,752	10,742	4,202
Staves and heading	.....	744	7,841	9,067
Ties, railroad	16,373	21,325	40,736	24,684
Tobaccoleaf	4,723	2,164	1,858	2,164
Timber, logs, etc	819,920	500,000	283,911	465,858
Whisky	57	43	51	54
Passengers	972	1,434	1,813	1,392
Total	907,146	628,600	462,208	614,373

ICE HARBOR AT MOUTH OF MUSKINGUM RIVER, OHIO.

The ice harbor is the lower pool of the Muskingum River, which has been created by the slack-water dam at Marietta, and the object of the work under consideration is to build a passway through this dam, of such size as will permit Ohio River packets and coal fleets to take refuge from ice in this pool. The passway in question consists of a large lock, which, owing to the local conditions controlling the only available site, was built with independent axes of entrance and exit. The work has been in progress since 1880, but has been kept back by inadequate appropriations and the occasional absence of any appropriation. The lock is now nearly finished and is in use, but requires some additional work in providing machinery for operating the gates and finishing a small amount of masonry. Middle gates should be provided for more rapid operating in passing the boats that use the locks most. A lockkeeper's dwelling should be built, and the grounds about the lock, which belong to the city of Marietta, and have been used by the United States for a number of years without cost, should be placed in presentable order, all of which will cost about $10,000. There being but a few dollars available, the only expenditures during the year were for enlarging well to receive turbine casings and placing timber seats for turbines.

The lock can not be made available for the larger class of steamboats that usually navigate the Ohio and Muskingum rivers until the bridge of the Baltimore and Ohio Southwestern Railroad Company, just below it, has been changed. No steps have been taken by the railroad company to make the required alterations.

The total amount appropriated for this work to date is $327,500.

The amount that can be profitably expended in ensuing fiscal year, $10,000.

OHIO RIVER.

The first appropriation for the improvement of the Ohio River was made in 1827, and its improvement has been carried on with various interruptions, caused by intermittent appropriations and exceptionally high stages of water, from that time up to the present year. The usual manner of effecting these improvements in the navigation of the Ohio River is to secure additional depth at islands and sand bars by the construction of low dams across unused or abandoned side passages and by building guiding dikes where the river is so wide and shoal as to render necessary the confinement of the current to a smaller cross section. A snag boat and two dredges are owned by the United States Government, which find constant employment in taking out snags and wrecks and in dredging away gravel bars which can not be otherwise removed. Statistics of the Ohio River commerce have never been accurately collected, but enough is known to indicate its immense and rapidly increasing value, the river commerce of the city of Cincinnati alone exceeding $50,000,000 annually.

Comparative table showing coal shipments from Pittsburg during the nine years ending December 31, 1892.

Year.	To Cincinnati.	To Louisville.	Total.	Year.	To Cincinnati.	To Louisville.	Total.
	Tons.	*Tons.*	*Tons.*		*Tons.*	*Tons.*	*Tons.*
1884	946,124	1,160,292	2,106,416	1889	1,149,892	1,439,747	2,589,639
1885	1,733,104	1,114,008	2,847,112	1890	1,324,641	2,095,716	3,420,357
1886	1,262,702	2,220,530	3,483,232	1891	1,065,705	1,828,047	2,893,752
1887	788,690	1,367,012	2,155,702	1892	914,430	1,384,864	2,299,294
1888	1,950,882	2,223,494	4,174,376				

Commerce passing Davis Island dam in 1892.

Vesssels.	Ascending.				Descending.				Total freight.
	Through lock.	Freight.	Through pass.	Freight.	Through lock.	Freight.	Through pass.	Freight.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*Tons.*
Packets	75	4,740	381	42,365	74	3,983	373	36,218	87,306
Towboats	261	.....	1,311	.....	247	.....	1,309	.....	.....
Model barges	2	.....	83	.....	2	.....	79	61,800	61,800
Coal boats	92	.....	515	.....	1	.....	1,069	976,599	976,599
Barges	490	2,557	3,092	26,324	36	7,252	3,454	1,747,600	1,783,733
Flats	370	1 658	1,081	17,360	301	18,340	1,472	378,296	315,654
Rafts	.....	.....	2	.....	23	8,433	60	210,395	218,828
Miscellaneous	32	.....	80	.....	48	.....	97	.....	.....
Total	1,322	8,955	6,545	86,049	732	38,008	7,913	3,310,908	3,443,920

The great and growing commerce of this river, its numerous cities, and the rapid increase of the already large population of the valley, should appeal in strong terms for adequate appropriations for such

betterment of the navigation as it is certain can be obtained by well-known methods.

The total amount appropriated to date for this river is $5,204,310.77. In addition to this, $337,000 has been allotted for this river out of other appropriations.

The navigation of the river has been greatly improved, commerce benefited, and freight rates considerably reduced.

The last appropriation for this river, $360,000, was made in the river and harbor act of July 13, 1892. The amounts specified in the act, which may be expended at special points, are as follows:

For Great Miami embankment	$13,000
For improving the navigation at Mound City, Ill	30,000
For dredging in Brooklyn Harbor, Illinois	10,000
For completing the work at Shawneetown, Ill	7,000
Total	60,000

Deducting this amount of $60,000 from $360,000 leaves $300,000 to be expended upon general improvements.

The Great Miami embankment was completed during the year and has resulted in great good; the embankment at Shawneetown was enlarged; dredging was carried on in Brooklyn Harbor, 39,286 cubic yards of material having been removed.

Dredging was also done at Rock Bar, Cullums Ripple, Rising Sun, French Island, Bowlesville, and other points. Several dikes were completed and others repaired during the year. The dam at Davis Island has proved to be of great service to the coal trade during the year.

The estimate for 1894–'95 is as follows:

Low dikes and dams	$600,000
Repair, maintenance, and modification of existing structures	50,000
Two iron-hull dredges, fitted with tools for repair work	70,000
Four dump scows	17,000
Four fuel flats	5,000
Two decked flats	5,000
Two steamboats, tenders for dredges	50,000
Dredging work	50,000
Continuing work at mouth of Licking River	10,000
Special surveys	10,000
Various expenses, including establishment of harbor lines, expenses of boards of engineers, inspections of bridges, etc	33,000
General administration, engineering, and inspection	50,000
For contingencies	50,000
	1,000,000

The appropriation of the above sum is urgently requested by the engineers.

MOVABLE DAM IN OHIO RIVER, NEAR MOUTH OF BEAVER RIVER, PENNSYLVANIA.

The first appropriation for the work was made September 19, 1890 ($250,000), and by the river and harbor act of July 13, 1892, an additional amount of $100,000 was appropriated.

This dam, which is located 30 miles below Pittsburg, Pa., will be the sixth in the series of movable dams for improving the Ohio River by slack-water navigation. Davis Island Dam, located 5½ miles below Pittsburg, and which has been in successful operation since October, 1885, is the first of the series. The land necessary for the site of this dam on both sides of the river was acquired, drawings prepared, and

the preparatory work begun during the fiscal year ending June 30 1892. All the temporary buildings were erected and the plant required in the construction of the permanent work was purchased and placed in position. The cofferdam for the lock was completed Novem- 11, 1892, inclosing 6.3 acres. The permanent foundations for boiler house were completed and the drift chute for lock was completed for a distance of 292 feet. The excavations for foundations of the river wall of lock were commenced October 7, 1892. The cofferdam was injured, but not materially, during the winter.

Movable Dam No. 2, Ohio River.—The river and harbor act of July 13, 1892, provided for the use of so much of the money appropriated for the movable dam at Beaver as might be necessary for making a survey for the location of a dam, No. 2, and for obtaining title to the land. The survey has been made.

The amount expended on this work up to the close of the fiscal year ending June 30, 1892, was $6,745.24.

The amount (estimated) required to complete the existing project, $550,000. Amount that can be profitably expended in ensuing fiscal year, $200,000.

SAGINAW RIVER, MICHIGAN.

The Saginaw River is formed by the Flint and Shiawassee rivers, which unite in Saginaw County, Mich. After flowing in a north-easterly direction for about 30 miles from this confluence it enters Saginaw Bay, some 5 miles below Bay City.

The commerce of the river is of considerable importance, and for the last ten years has varied little in amount. About 2,000 vessels per annum enter and clear from Saginaw River ports, and the shipments from this locality during 1892, valued at about $20,000,000, were as follows:

Commodity.	Amount.	Tons.	Commodity.	Amount.	Tons.
Pine lumber..feet, B. M..	815,054,465	1,222,581	Oak staves .....pieces..	290,000	1,450
Shingles .....pieces..	221,839,000	33,276	Hard wood...feet, B. M..	11,427,890	22,856
Lath.....do....	129,731,800	32,433	Hemlock .....do....	16,895,033	16,895
Salt.....barrels..	1,826,957	274,044			
Staves .....pieces..	31,981,191	15,990	Total	.....	1,625,369
Headings .....sets..	2,922,122	5,844			

Prior to improvement the entrance was obstructed by an extensive bar in Saginaw Bay about a mile from shore and a half a mile across between the 10-foot contours, with a minimum depth of 9 feet.

Between the mouth and Bay City, a distance of 5 miles, the depth varied from 15 to 30 feet. Thence to the head of the river the prevailing depth was from 12 to 20 feet, but with several bars with 7 feet only obstructing the channel and the division of the current by islands at certain points impairing its effect in maintaining the depth.

There was thus a natural capacity for a 12-foot navigation, and the original project of 1866, at which time the improvement was begun, adopted this as a channel datum.

In 1882 a revision called for 14 feet from the bay to Bay City and thence upward 12 feet with a uniform width of 200 feet. As the improvement progressed various additions to and modifications of the project were made, in especial the construction and extension of heavy training walls with lighter revetments opposite them to regulate the current at Carrollton and at the head of Crow Island.

The total expenditures to July 1, 1892, were $555,132.31 and for the fiscal year, $33,479.58.

Under the appropriation of $100,000 in the act of July 13, 1892, work was carried on as follows:

At the bar outside the entrance dredging has been carried on at Essexville Bar, 43,371 cubic yards of material has been removed, making the channel 200 feet wide and 14 feet deep. About 18,020 cubic yards of material was dredged from west channel at West Bay City giving a serviceable channel of 12 feet deep and 50 feet width.

Work was done on Melborn Bar and a channel 100 feet wide and 12 feet deep would have been finished had not one of the dredges been sunk.

Amount that can be profitably expended in fiscal year ending June 30, 1895, $150,000.

MOUTH OF BLACK RIVER, MICHIGAN.

Black River empties into the St. Clair River at Port Huron, Mich. Just below its mouth and extending out beyond the center of the St. Clair River is a bar or shoal, which was dredged by the Government at an aggregate cost of $56,500 to a depth of 15 feet. Since this result was accomplished the deposits of sediment brought down by the current of the Black River have reduced the depth to a little over 14 feet, rendering this shoal, in conjunction with a low stage of water, a serious impediment to navigation along the front of the city.

The local commerce for the season of 1892 is reported as follows:

	Number of vessels.	Registered tonnage.
Entered	1,103	264,183
Cleared	1,122	283,771
Total	2,225	547,954

Further examination was made in 1886 and project adopted to redredge and deepen it to 16 feet, and this work has been completed during the fiscal year, with the addition of increasing the depth to 18 feet for a limited area on the eastern border of the shoal immediately adjacent to the main channel.

The shoal is derived from erosion of the banks and bed of the St. Clair below Port Huron by the powerful current of the river, reaching at times 7 miles per hour, and from débris brought down in freshets by Black River, which discharges across the shoal. The entire area is reported as deepened to 16 feet, which, however, does not meet the present requirements of general lake navigation, and the shoal will no doubt reform, as the causes that produced it are still in full operation.

The total expenditures to July 1, 1892, were $76,958.70, and for the fiscal year $9,541.30.

An appropriation of $10,000 to provide for maintenance will be needed for fiscal year 1895.

CLINTON RIVER, MICHIGAN.

The natural capacity of Clinton River is from 10 to 8 feet, with several bars and bends obstructing the navigation, but the entrance is across a flat with 3 or 4 feet only at the shallowest point and the 10-foot

contour half a mile from shore. In 1870 an entrance channel was dredged 2,700 feet long, 100 feet wide, and 9 feet deep, but later filled again.

In 1880 a project for the general improvement of the river was made to extend to Mount Clemens, 8 miles up, the channel to be deepened to 8 feet and the bends straightened and held by dikes, the entrance to be deepened to 9 feet and protected by a pile dike extending off shore to the 10-foot contour. The total cost of the project as amended and finally approved in 1889 was $32,926, on the basis of a continuous prosecution of the work to completion.

The river work proper has been completed, its cost being enhanced by much additional dredging due to the prolonging of the work over several seasons, involving charge for maintenance, not included in the original estimate.

The permanent improvement of the entrance is yet to be made. A brush mattress, covered with stone, was laid in 1882 for about half the whole length of the protection dike. For the maintenance of an entrance channel pending construction of the permanent works, repeated dredging was required that vessels might have access to the river, and the successive appropriations made have been depleted by charges of this kind, with the effect of postponing the building of the dike.

The appropriation of $8,564 in the act of July 13, 1892, completed the appropriation of the original estimate for construction.

The expenditures to July 1, 1892, were $51,398.48, and for the fiscal year $1,336.58.

In addition to the work now under contract, which practically exhausts the balance available, provision for the following is needed:

First. The open interval between the west end of the outer section of training dike and the old light-house crib, amounting to about 1,230 linear feet, where the brush and stone mattress work now lies submerged, should be closed by the shoreward continuation of the dike. The estimated cost of this is $9,000.

Second. The old pile crib at the lake end of the work, which was built in 1881, and of which little is left, except a few inclined piles and some stone in the bottom, should be solidly rebuilt and filled with stone. With the training wall in position such movement of ice as may occur must pass the outer end and the crib will take its full effect. The estimated cost is $2,000.

Third. An additional row of piles 8-foot centers should be driven parallel to and connected with the shore section of the work along its back or north face, from which direction a nearly constant littoral current due to the outflow of the north channel of the St. Clair River brings down floating ice that sometimes accumulates in heavy masses. The estimate is $2,000.

Fourth. The channel should be dredged to 10 feet, with a width of 100 feet, and the spoil thrown over and deposited behind the channel face of the training wall. The estimate is $5,000, making a total amount of $18,000 that can be expended in fiscal year ending June 30, 1895.

COMMERCE.

Receipts and shipments by vessel, 1892.

[Compiled from statement furnished by Mr. Frank E. Nellis, deputy collector of customs, Mount Clemens, Mich.]

Articles.	Quantity.	Tons.	Articles.	Quantity.	Tons.
Brick	250,000	625	Lumber, feet B. M.	6,500,000	11,375
Coal	.....	10,000	Posts	1,500	300
Cooperage	.....	9,120	Salt, barrels	1,000	140
Gravel, cubic yards	175	227	Shingles	5,250,000	656
Lath	22,000,000	6,660	Stone, cords	650	4,062
Lime and cement, barrels	750	112			
Logs, feet B. M.	6,200,000	15,500	Total	.....	58,777

ROUGE RIVER, MICHIGAN.

Rouge River is a small stream emptying into the Detroit River near the southwestern limits of the city of Detroit. It was formerly navigated by light-draft vessels as far as Dearborn, a distance of some 15 miles. As various manufacturing industries were established on its banks, the river grew into commercial importance, and in June, 1887, a survey was made with a view to its improvement.

The vicinity of Detroit, and the establishment of important industies on its banks, gives the navigation a certain commercial value, and the project adopted for its improvement in 1887 provides for dredging to a depth of 16 feet, with widths varying from 240 feet at the entrance from the Detroit River to 70 feet at the upper limit below the Wabash Railway bridge, a distance of about 15,000 feet.

With the $20,000 appropriated by the river and harbor acts of 1888 and 1890, the dredging was carried about 13,000 feet upstream, leaving some 1,800 feet to be gone over between the two railway bridges at the upper end, with considerable widening to be done in the lower reaches.

Under the appropriation of $11,690, made in the act of July 13, 1892, the work was completed as projected, and some of the earlier cuts redredged, leaving a small balance to the credit of the work.

The total amount expended to July 1, 1892, was $19,866.83, and for the fiscal year $10,405.96.

It is not to be expected that a dredged channel in a narrow stream with soft bed and banks will maintain itself, and there should be a sum in hand sufficient to provide for the inevitable shoaling and other contingencies. An estimate of $5,000 for the fiscal year 1895 is made for this purpose.

COMMERCIAL STATISTICS.

No commercial statistics have been obtained for this river, but they are presumed to aggregate, as heretofore reported, abont 311,000 tons.

DETROIT RIVER, MICHIGAN.

Originally the channel at Limekiln Crossing, Detroit River, could not be depended upon for more than 13 feet of water, the ordinary depth being much affected by the direction of the wind. As originally projected in 1874, the improvement at this point was to consist of a curved channel 300 feet wide, with a uniform depth of 20 feet. Subsequently, however, the project was revised so as to provide for a straight

channel of the same depth, but with a width of 440 feet, and these dimensions were practically secured in October, 1890.

The estimated cost of a 400-foot channel was $1,374,500. The total amount expended up to June 30, 1891, was $702,122.04. and the result has been a channel 440 feet in width, thus accomplishing one-tenth more work than was estimated for at a cost of but little more than half the estimate. Gratifying as this is, the benefit to commerce is far beyond the amount of the original estimate, and since the excavation is through rock, the improvement will be permanent.

The only work in progress during the fiscal year was an examination of the channel from "Ballards Reef" to the head of Limekiln Crossing. This work was done with a sweeping scow, and an area $2\frac{1}{6}$ miles long and from 800 to 1,000 feet wide was swept, the longitudinal axis of this area being marked by the range lights at the head of Grosse Isle.

An unexpected state of affairs was discovered. Large bowlders were found scattered along in the channel and some bed rock was found above the grade of the bottom of Limekiln Crossing. The channel is navigable for vessels drawing not more than $16\frac{1}{2}$ feet.

All the bowlders and bed rock in and near the channel will have to be removed to the same grade as the Limekiln Crossing work, in order to render Limekiln Crossing and the Ship Channel connecting the waters of the Great Lakes between Chicago, Duluth, and Buffalo available for a 20-foot navigation.

The present project contemplates the removal of such shoals in Detroit River, between the city of Detroit and Lake Erie, as obstructs navigation.

The approved estimate for obtaining a channel 20 feet deep and 800 feet wide from the head of Ballards Reef to the head of Limekiln Crossing is $180,000, of which $28,744.95 is available from appropriation made under previous estimate, leaving $151,255.05 to be appropriated, all of which will be required during fiscal year ending June 30, 1895.

Amount (estimated) required for completion of existing project, $151,255.05; which can be profitably expended in fiscal year ending June 30, 1895.

COMMERCIAL STATISTICS.

Commerce of Detroit River during the season of 1892, comprising only such staples a[8] cleared from United States ports.

Commodities.	Amounts.	Tons.	Commodities.	Amounts.	Tons.
Iron ore and finished iron	.....	2,721,601	Salt .....barrels..	415,000	69,166
Coal.....	.....	7,318,126	Oil cake .....sacks..	590,000	29,560
Wheat .....bushels..	92,490,560	2,730,310	Provisions.hogsheads..	210,000	42,000
Flour .....barrels..	11,747,967	1,174,960	Lumber....feet, B. M..	1,052,785,000	2,130,000
Corn .....bushels..	45,149,436	1,551.167	Laths .....pieces..	71,496,000	19,000
Oats .....do....	18,613,343	286,358	Shingles .....do....	112,238,000	27,550
Barley .....do....	4,954,000	119,000	Cement .....barrels..	822,000	102,270
Flaxseed.....do....	5,833,470	163,337	Telegraph poles ..pcs..	62,000	16,000
Grass seed.....do....	3,280,000	73,800	Merchandise ....pkgs..	6,680,000	2,640,000
Copper ore	.....	83.614			
Stone	.....	256,000	Total.....	.....	26,553,819

Number of vessels, 33,860; registered tonnage, 24,785,000, exclusive of Canadian vessels. If the latter could be included and the list of commodities made to include all that were carried, whether cleared from a custom-house or not, the total would be much greater.

THUNDER BAY RIVER, MICHIGAN.

Work was commenced here in 1876, and was designed to provide a navigable entrance from the bay into the river of not less than 14 feet

depth. The desired dimensions were obtained in 1884, and further work was suspended.

The commerce of the harbor at the mouth of this river is already considerable, most of it going and coming from the city of Alpena, but a small proportion making use of its shelter during prevailing easterly storms.

The general project for the improvement of Thunder Bay River calls for a channel 16 feet deep between the wharf lines established by the city engineer in 1888, the width varying from 100 feet at the mouth to 50 feet above, and the improvement extending from the entrance to the dam, 1 mile above.

The appropriation of $10,000 made by act approved September 19, 1890, was expended in dredging the river from its mouth to a point about seven-eighths of a mile above. Here bed rock was found, and the cost of a further extension of channel was deemed too great to be warranted by the possible benefit.

The appropriation of $10,000 made by act approved July 13, 1892, was entitled "Improving Thunder Bay River, Alpena, Mich., continuing improvement." There being no special appropriation for Thunder Bay "Harbor," as in 1890, and the project for deepening the river from its mouth to 1 mile above being practically completed, the appropriation for Thunder Bay River was applied to dredging the channel across the bar at the mouth of the river to the depth of 16 feet, where the harbor appropriation of 1890 had been expended in "restoring the 14-foot channel."

As the channel depth and width, both at the entrance and inside the mouth, are likely to deteriorate in time from the action of current and sea and the movement of vessels, an appropriation of $5,000 for the maintenance of the navigation is estimated for 1895, under the common title "Alpena Harbor."

BLACK RIVER AT PORT HURON, MICH.

Black River is a sluggish stream passing through the business portion of the city of Port Huron, Mich., and entering St. Clair River at a distance of about $2\frac{1}{5}$ miles from the foot of Lake Huron. The lower reach of Black River, from its mouth to the Grand Trunk Railroad Bridge, is nearly $1\frac{1}{2}$ miles long and varies in width from 120 to 150 feet. It has a navigable channel of from 10 to 14 feet in depth, except at a few points where it is obstructed by shoals or bars having only $8\frac{1}{2}$ feet of water over them.

The shores of this part of Black River are occupied by about 25 mercantile and manufacturing establishments which more or less depend upon water navigation for the receipt of their raw materials and the shipment of their manufactured goods. The business done by these establishments exceeds $2,000,000 per annum. The amount of merchandise handled by them during the year 1890 was as follows:

Articles.	Quantity.	Tons.	Articles.	Quantity.	Tons.
Brick	1,780,000	4,450	Shingles	10,300,000	1,287
Coal		54,000	Stone ....cords..	800	5,000
Hay and feed		100	Ties ....do...	600	900
Lath	4,700,000	1,410	Wood....do...	16,000	24,000
Lumber....feet, B. M..	16,350,000	28,612			
Posts	420,000	8,400	Total		128,189
Salt		30			

The improvement of the river was begun in 1890 on the basis of a project calling for 16 feet, with a width at the entrance of 160 feet, diminishing to 75 feet at the upper limit. The cost of the work was estimated at $75,000. Dredging began in the spring of 1891 and was continued, with suspension during the winter, to August 31, 1892. On June 30, 1892, a distance had been covered of some 6,200 feet, with a width of 75 feet in the lower part and 50 feet above.

When the contract was closed, August 31, the entire distance to the Grand Trunk Railway Bridge had been covered, but the full width had not yet been attained.

A new contract was made under the act of July 13, 1892, but the contractors lost their plant on Lake Erie while en route to Port Huron in October, 1892, and being unable to secure other plant the contract was annulled for failure to begin as specified, viz, May 1, 1893. The work was again advertised and a new contract made.

The total expenditures to July 1, 1892, were $10,625.50, and for the fiscal year $14,374.35. The current appropriation will probably suffice to complete the project as prescribed, but the dredged channel in so narrow a stream can not maintain its depth, and an estimate of $5,000 for maintenance is made for 1895.

WATER COMMUNICATION ACROSS KEWEENAW POINT, MICHIGAN.

The river and harbor act of 1890 provided for the purchase of the Portage Lake Canals across Keweenaw Point from Keweenaw Bay to Lake Superior, at a cost of $350,000, and in addition made an allowance of $10,000, both for that and the ensuing fiscal year, for maintenance and control. The conditions of the act in respect to title and jurisdiction having been fully complied with, the Government assumed formal control of the canals on August 3, 1891, and as the property is now vested solely in the United States, the question of improvement and care requires attention.

The improvements consist of entrance piers at the harbor entrances on Lake Superior and Keweenaw Bay, canals and canal revetments, dredged cuts and channel ways, lights and buoys. There are no locks. When the United States assumed charge the piers and revetments were, and are now, in a dilapidated condition, bars had formed at the harbor entrances, and many places in the channel ways had shoals by deposition of material.

As the waterway is intended for the use of all vessels that navigate Lake Superior, and is actually used by a large proportion of them, it is necessary that the depth and width of the channels shall at least be equal to that of the St. Marys Falls Canal, which now limits the maximum draft and dimensions of the largest vessels which run to Lake Superior.

The last river and harbor act appropriated $50,000 for improvement, which is being expended in dredging the existing channels to a 16-foot depth, and in repairing some of the worst portions of the canal revetments.

The condition of the waterway has been greatly bettered since the United States acquired ownership, and no complaints from vessel men have been received this year. A least depth of 14 feet exists throughout the waterway. A legislative enactment imposing severe penalties for a violation of the established rules and regulations for the use of the canals is urgently needed.

The amount (estimated) required to complete existing project is $1,245,000. Amount that can be profitably expended in fiscal year ending June 30, 1895, $800,000.

COMMERCIAL STATISTICS.

Statistics of vessels passing through the canals during the calendar year 1892.

Bound up.	Number.	Net tonnage.
Steam	679	342,083
Sail	223	109,135

Statement of freight and passengers carried through the Portage Lake and Lake Superior canals during 1892.

Bound up.	Net tons.	Bound up.	Net tons.
Coal	221,588	Miscellaneous merchandise	91,654
Flour	18	Copper	5,394
Grain	1,669	Pig iron	44
Manufactured iron	17,815	Miscellaneous freight	12,325
Salt	2,378	Passengers ....number..	16,963
Limestone	14,880		

RECAPITULATION.

	Total.	Upper canal.		Number.	Net tonnage.
Number of vessels	902	454	Bound down—		
Net tonnage	451,218	309,171	Steam	461	164,037
Freight ....tons..	357.773	196,937	Sail	107	49,808
Passengers	16,963	10,453			

Statement of freight and passengers carried through the Portage Lake and Lake Superior canals during 1892.

Bound down.	Net tons.	Bound down.	Net tons.
Copper	42,115	Lumber	41,094
Corn	87	Coal	594
Wheat	475	Miscellaneous freight	5,422
Flour	15,093	Miscellaneous merchandise	12,833
Building stone	18,205	Passengers....number..	13,030
Pig iron	2,597		

RECAPITULATION.

	Total.	Upper canal.		Total.	Upper canal.
Number of vessels	568	185	Freight....tons..	138,515	70,619
Net tonnage	213,845	90,125	Passengers	13,130	6,587

In addition to the above, the trade carried on by tug boats is tremendous.

ST. JOSEPH RIVER, MICHIGAN.

The St. Joseph is a small river rising in Hillsdale County, Mich., and flowing in a generally northwestern and tortuous course until it empties into Lake Michigan through St. Joseph Harbor.

The navigated portion of this river is from St. Joseph Harbor, into which it discharges, to Berrien Springs, a distance of about 25 miles. During the summer a small light-draft steamer makes daily trips, carrying fruit, passengers, and general freight.

At several points the navigation is obstructed by bars, snags, and bowlders, and the project of March, 1889, provided for taking out the larger obstructions and forcing the current to cut channels through the bars by building suitably located and roughly devised wing dams of materials at hand such as brush, stone, and water-soaked logs, with a view to securing 3 or 4 feet at low stage.

The work done in 1890 and 1891, though rude and inexpensive, was sufficiently effective to require no further expenditures during the season of 1892, but the heavy freshets in the spring of 1893 have no doubt created additional obstructions; and work on the river will be required at two or three places.

In anticipation of this the allotment of $1,000 from the appropriation for St. Joseph Harbor, authorized in the river and harbor act of July 13, 1892, has been reserved and is available.

For further dam construction, removal of snags, etc., an appropriation of $2,000 will be needed.

The above amount can be profitably expended in ensuing fiscal year.

COMMERCIAL STATISTICS, ST. JOSEPH RIVER, MICHIGAN, 1892.

The steamer *May Graham* (95 tons, load draft 30 inches) made 111 trips from St. Joseph to Berrien Springs and return, carrying 12,000 passengers and 6,151 tons of miscellaneous freight.

CHIPPEWA RIVER, INCLUDING YELLOW BANKS.

The Chippewa River, flowing through the central and western portion of Wisconsin, forms one of the most valuable arteries of navigation for the lumber and timber interests in the entire State; but since the construction of a branch railroad running close to and generally parallel with the river the freight and passenger traffic has in some measure declined. Here as elsewhere, however, the river competition obliges the railroad to maintain fair and reasonable rates of transportation.

The project for the improvement of the Chippewa consists in revetments of caving bends and construction of dams and jetties from Eau Claire to the confluence of the stream with the Mississippi River, a distance of 57 miles, to confine the low-water volume to a channel of nearly uniform width and depth. This general plan for improvement has been in force since 1877.

The object of protection of the Yellow Banks is to prevent erosion of the high sand bluffs or banks bordering the Chippewa River at a number of points below Eau Claire, and to thereby relieve the channels of that river and of the Mississippi below the junction of the two streams from the masses of sand contributed by those banks. The plan for protection consists in a revetment of piling and fascines, the latter to be crowned with rock. The estimated cost of the consolidated improvement, including all expenses from the commencement, is $272,487.72.

Before the improvement commenced the depth on the bars at low water seldom exceeded 18 inches, and the crossing at the mouth of the

river was extremely difficult at that stage, owing to the volume of the river joining the Mississippi through a number of channels of insufficient depth. These latter-named channels were contracted into one of good depth by means of long parallel jetties. Generally, wherever works for improvement were constructed by the Government, the low-water depths were increased from 18 inches to 3 to 4 feet, and the general improvement not only greatly facilitated the passage of steamers and rafts, but also greatly reduced the expense of rafting manufactured lumber.

The localities remaining to be improved have a least depth in the channel of about 2 feet.

No work, except slight repair, has been done at the Yellow Banks since 1883, when 4,978 linear feet of bank revetment had been completed, and the piling for 3,275 feet had been driven ready for the backing of brush and stone.

The total expenditures from the commencement of operations in 1877 to June 30, 1892, including outstanding liabilities, were $165,574.78.

During the past fiscal year there has been constructed a brush and stone dam at Eau Galle Flats. Slight repairs were made to the Plum Island Flats Dam No. 3.

The new work is of too recent a date to indicate its permanent effect on the low-water channel.

Amount (estimated) required for completion of existing project, $100,737.72; amount that can be profitably expended in fiscal year ending June 30, 1895, $60,000.

Comparative statement of freight and passengers for twelve years.

Year.	Steamboats.	Freight carried.	Passengers.	Year.	Steamboats.	Freight carried.	Passengers.
		Pounds.				*Pounds.*	
1892	1	.....	.....	1886	1	.....	4,700
1891	1	.....	.....	1885	1	690,000	4,728
1890	1	.....	.....	1884	2	1,500,000	5,500
1889	1	.....	.....	1883	3	3,184,000	4,000
1888	1	.....	.....	1882	3	2,640,000	10,490
1887	1	600,000	1,400	1881	3	3,932,000	16,989

FOX RIVER, WISCONSIN.

The Fox River rises in the central part of Wisconsin and flows westward to Portage City, which is also on the Wisconsin River. At this place the Fox and Wisconsin rivers are only 1½ miles apart, and are connected by a canal. After flowing in a very tortuous course some 200 miles further, and after passing through Lake Winnebago, the Fox enters Green Bay at the city of Green Bay.

It is an important channel of trade and navigation, and forms a part of the navigable waters by which steamboats can pass from the Mississippi into Lake Michigan.

The works for the improvement of the Fox and Wisconsin rivers were purchased by the United States from the Green Bay and Mississippi Canal Company in 1872 for $145,000. These works were all, except one stone lock, temporary structures, many of them in bad condition. There was no low-water navigation on the Upper Fox, and on the Lower Fox navigation was uncertain.

The present project provides for the renovation of eleven old locks, the deepening and widening of the channel of the Fox River from Montello to Green Bay to 6 feet depth and 100 feet width, and that from

Portage to Montello 4 feet of water at low water be maintained. The estimate for this was $602,000.

The amount expended on the Fox and Wisconsin rivers from 1867 up to the close of the fiscal year ending June 30, 1892, including $145,000 paid to the Green Bay and Mississippi Canal Company for works of improvement under act of June 10, 1872, was $2,605,090.24, and under modified project for the Fox River $281,265.06, making a total of $2,886,355.30.

The result of the expenditure upon the Fox River was: The construction of fourteen new locks of stone; seventeen dams, four of which are temporary; twelve cut-offs; a head wall and feeder at the old first lock at Appleton; a wing dam of brush and stone for a shore protection to the Portage Levee; guard gates at head of Kaukauna Canal; a channel 75 feet wide and 450 feet long by blasting and dredging the rock bar below DePere Lock to from 4 to 12 inches below the top of the lower miter sill; channel below DePere excavated to 12½ feet depth for a width of from 50 to 60 feet; deepened channel at mouth of Fond du Lac River; Neenah Channel; Fox River at head of Lake Butte des Morts; Grignon Rapids, and in the canals and Upper Fox River.

During the season of 1891 on the Lower Fox boats drawing 5 feet of water could run from Green Bay to Oshkosh until about August 1, when the mills at Neenah, Menasha, Appleton, and Kaukauna had drawn the water so low below the crests of the dams that there was not over 3 feet of water in the channel, and at times there was a depth of but 6 inches on the breast wall of the Kaukauna first lock. On the upper river, on account of the low water during September, the larger boats were obliged to lay up for the remainder of the season.

During the season of 1892 there has been a good navigable depth of water.

During the fiscal year ending June 30, 1893, $59,473.84 was expended and the following work done: A new lock has been built to replace the old one at Portage, Wis.; the channel at Grignon Rapids, 80 feet wide, is about completed; a new middle platform was built in the combined locks at Little Chute with new steel valves, gearing, etc., and minor improvements; a portion of the Kaukauna Canal bank was rebuilt and a portion of the canal bed puddled with clay; two new lock-houses were built, and various repairs made to boats, dredges, and quarter boat.

Amounted (estimated) required for completion of existing project- $271,000; amount that can be profitably expended in fiscal year end, ing June 30, 1895, $100,000.

COMMERCE.

Articles.	Quantity.	Articles.	Quantity.
	Tons.		*Tons.*
Apples	21	Lumber	12,481
Beer	99	General merchandise	2,770
Brick	11,447	Nails	2
Cedar posts	465	Pig iron	180
Clay	810	Potatoes	57
Coal	15,195	Pulp-wood	26,254
Cord wood	25,460	Salt	2,062
Drain tile	112	Sand	7,931
Flour	97	Sewer pipe	205
Grain, millstuffs, etc	2,602	Shingles	156
Gravel	6,027	Stave bolts	160
Lath	33	Stone	15,428
Lime	765		
Logs	160,481	Total	291,300

Passengers, 43,673.

MENOMONEE RIVER, MICHIGAN AND WISCONSIN.

This is one of the largest rivers emptying into Lake Michigan.

The river and harbor act of September 19, 1890, appropriated $54,000 for "continuing the improvement up the river from termination of old work," and the original approved project was for dredging a channel 200 feet wide and 16 feet deep from Green Bay up the Menomonee River as far as the funds available would allow, the object being to create a navigable channel 16 feet deep from Green Bay to N. Ludington Company's mill, a distance of about 2 miles. The project has been modified by reducing the upper 2,600 linear feet to a width of 100 feet.

The total amount expended up to the close of the fiscal year ending June 30, 1892, was $38,145.01 in dredging 230,323 cubic yards of material.

The lower section of 6,550 feet in length had then a channel 200 feet wide and 16 feet deep. The middle section, 2,750 feet long, had been dredged to a depth of 16 feet for a varying width of 90 to 170 feet, and upon the upper section of 2,400 feet no work had yet been done. The channel had a depth of from 1 to 13 feet.

During the fiscal year ending June 30, 1893, $23,449.86 was expended in drilling and blasting in hardpan, and in dredging 73,165 cubic yards of material, and the work is still in progress. The two lower sections have now a channel 200 feet wide, except for a limited portion of their length, and a general depth of 16 feet. The upper section is practically completed for about 1,000 linear feet, and the governing depth in the remainder is about 4 feet.

For the maintenance of the channel $10,000 is required for ensuing fiscal year.

ST. CROIX RIVER, WISCONSIN AND MINNESOTA.

The largest steamers plying the Mississippi River between St. Paul and St. Louis ascend the St. Croix to Stillwater, the head of an immense steamboat and lumber-rafting business. Smaller steamers run between Stillwater and Taylors Falls, carrying passengers, agricultural implements, grain, etc.

The original project for improvement, adopted in 1878, was based upon a survey made in 1874, when the river was at a high stage of water and but comparatively few obstructions to be seen. It contemplated removal of snags, bowlders, sand bars, etc., and contraction of low-water channels from Taylors Falls to the confluence of the river with the Mississippi into one of nearly uniform width. Estimated cost, $21,758. At low water, however, the channel had, in many places, but 2 feet depth, and steamers and barges made their way as best they could amongst the obstructions; at times it was impossible for them to get over the shoal places. The present project, adopted in 1880, and modified as to cost in 1882, and again in 1889, is based upon a low-water survey made in 1879, and differs from that originally adopted only in amount of work to be done. Estimated cost, $108,700.

The expenditures under present project to June 30, 1892, including outstanding liabilities, were $82,461.02.

The total expenditures under original and present projects to June 30, 1892, including outstanding liabilities, were $100,461.02.

The effect of the work of improvement has been to secure a least depth of 3 feet on the improved bars above Stillwater, and 4 to 5 feet on the bars below that place. Generally it may be said of this improve-

ment that at many points navigation has been rendered permanent where formerly it was uncertain, and that in other places it has been made practicable where before improvement it was impossible.

In the improved parts of the river above Stillwater there is a low-water depth in the channel of 2 feet; below Stillwater there is a good channel with a least depth of 4 feet.

The work of improvement during the last year has consisted in removing a small bar at head of Lake St. Croix and in widening the channel over Hudson Bar by dredging. The work at Hudson enabled the raft boats, with their large tows, to more easily make the run over the bar.

Amount (estimated) required to complete existing project, $18,200; this entire amount can be profitably expended in fiscal year ending June 30, 1895.

COMMERCE.

The principal commerce of this river is in logs and log products. The volume is surprising. The quantity of logs brought to market at Stillwater during the season of 1890 was 460,000,000 feet or 1,610,000 tons. They are a product of the soil conveyed to market by cheap water transportation. The cost of transportation is about 10 cents per ton per 100 miles, or 0.1 cent per ton per mile. Obviously without water transportation the crop could not go to market, and the great lumber business of Minnesota and Wisconsin would not be in existence to-day. The output of logs during the same year on the Chippewa River was 606,992,790 feet and upon the Upper Mississippi 325,669,280 feet, making an aggregate tonnage on the three rivers of about 4,874,317 tons, valued at $14,000,000 from one product of the soil alone.

STURGEON BAY AND LAKE MICHIGAN SHIP CANAL.

Lake Michigan and Green Bay are separated by a strip of land about 75 miles in length and with an average width of 10 or 12 miles. Navigation between these bodies of water was originally maintained at the upper end of the bay.

About midlength of the bay there was a deep indentation in the western side of this separating land known as Sturgeon Bay. Its eastern end was distant from the western shore of Lake Michigan about 1½ miles.

The advantages that would result from making another communication at this place between the lake and the bay were soon perceived. These were claimed to be: A considerable shortening of distance for many vessels, with a proportionate gain in time; the avoidance of the dangers of the natural route, with a consequent saving of life and property; an increase in the value of Sturgeon Bay as a place of refuge by making it easily accessible from Lake Michigan, as it already was from Green Bay.

The river and harbor act approved July 13, 1892, appropriated $81,833 for making the canal free to commerce. The conditions of the act being fulfilled, the property was purchased from the company and the money appropriated therefor paid in April, 1893, and the United States assumed possession of the canal on April 25, 1893.

The canal is an open cut, without locks or gates, 7,200 feet long; it is 100 feet wide at the water surface and about 65 feet wide at bottom. Harbor works at the Lake Michigan entrance have been constructed by the United States. Dredging has been done in continuation of the channel 6,100 feet into Sturgeon Bay.

The amount (estimated) required to complete existing project, $98,450. This amount can be profitably expended in fiscal year ending June 30, 1895.

COMMERCE.

Arrivals and departures of vessels.

Description.	Arrivals (bound down).		Departures (bound up).	
	Number.	Tonnage.	Number.	Tonnage.
Steam (exclusive of local tugs)	917	197,155	958	205,970
Sail	1,209	259,935	1,071	230,265
Total	2,126	457,090	2,029	436,235

The total amount of freight passing through this canal during the year 1892 was 800,000 tons, valued at $10,000,000.

RED RIVER OF THE NORTH, MINNESOTA.

The portion of this river undergoing improvement is that from Breckenridge to the northern boundary line, and operations have been continued with some interruptions since 1877. Although but few steamers navigate the Red River at present, the fact of an improved river being available for an unlimited number of steamers and barges whenever railroad rates become insupportable operates to the advantage of the farming community.

In its original condition this river was seriously obstructed by bars, shoals, snags, sunken rocks, and so forth. The ruling depth at this time upon bars between Moorhead and Goose Rapids at ordinary low water was but 1½ feet, and below Grand Forks 2 feet, while between Moorhead and Abercrombie the navigation was at all times difficult.

The project for the improvement of this river from Breckenridge to the northern boundary line, adopted in 1877, and amended as to cost in 1883, consists in the removal of snags, leaning trees, and bowlders, and in dredging channels through the bars, at an estimated cost of $179,310. A revised estimate made in 1887 placed the cost of completing the improvement at $79,598.37. The engineer in charge submits in his report an estimate of $67,320 for the completion of the project. The last estimate has been necessitated by an increase in the quantity of material to be excavated and by the effect of the eight-hour law in increasing the cost of the work.

Before improvement, the ruling depth upon the bars between Moorhead and Goose Rapids at ordinary low water was but 1½ feet, and below Grand Forks, 2 feet, while between Moorhead and Abercrombie the navigation was at all times difficult.

The work to June 30, 1892, has resulted in opening a channel 3 feet deep at ordinary low water and 60 feet wide from Moorhead to a point 80 miles north, and a channel 4 feet deep at ordinary low water and averaging 60 feet wide from Grand Forks to a point 93 miles north by river; also in the removal of snags and trees between Moorhead and Abercrombie so as to afford safe passage for steamers between those points during high and medium stages of water.

The total amount expended, including outstanding liabilities, to June 30, 1892, was $214,180.60.

Dredging operations were continued during the past fiscal year and resulted in extending the dredged channels from a point 93 miles north of Grand Forks to the boundary line, and in improving 1 mile of Goose Rapids Flats. The improvement from Grand Forks north to the boundary line has now been completed.

The amount (estimated) required to complete the existing project, $67,320; this amount can be profitably expended in next fiscal year.

COMMERCE.

Comparative statement of freight moved by barges and steamboats during the past fourteen years.

Year.	Tons.	Year.	Tons.	Year.	Tons.
1892	14,256	1887	10,405	1882	31,652
1891	12,137	1886	10,507	1881	26,557
1890	1,710	1885	23,043	1880	21,651
1889	3,866	1884	29,046	1879	17,829
1888	12,140	1883	25,314		

MINNESOTA RIVER, MINNESOTA.

From 1867 to 1873, Congress appropriated $77,500 for improving the Minnesota River. In 1874 a survey was made from the mouth of the river to South Bend, a distance of about 116 miles, to determine the practicability of improving the navigation by means of canals, locks, and dams. Based upon this survey, estimates were made for five locks and dams, and removal of snags, etc., at a cost of $733,868.63, the cost of removing snags, etc., being therein placed at $34,585.10, including contingencies. Following this report, Congress made three appropriations of $10.000 each, applied to clearing the river of obstructions below South Bend.

The expenditures to June 30, 1879, were $117,457.

Since 1879, no work for improvement of the river has been undertaken. Under the appropriations above named, the removal of obstructions cleared the way over long stretches of the river between Minnesota Falls and a point about 30 miles below Henderson (16.7 miles above Shakopee). Little or no use was made of the cleared channels, as there was not sufficient water in the channel to permit navigation during the low-water periods. The rapidly caving banks on the upper section of this stream cause snags and leaning trees to form, so that channels that were cleared of them twelve years ago are more or less encumbered with them to-day.

No expenditures have been made for the improvement of the lower part of the river, which affords much better facilities for river traffic than the upper part.

From Shakopee to the Mississippi the river is deep, except on two bars. There are few snags on this reach.

The river and harbor act of August 11, 1888, appropriated $10,000 for improving the Minnesota River, including protection of the banks opposite the borough of Belle Plaine. It appearing, from an examination made in September, 1888, that the sum was inadequate for the purposes named, its expenditure for work of improvement was deferred until the further wishes of Congress in the matter might be known.

The river and harbor act of July 13, 1892, made the sum available for the improvement of the river, omitting the requirement for opera-

tions at Belle Plaine. Under the latter act an examination of the mouth of the river was made and work of improvement will be carried on during the ensuing year.

The total expenditures on the improvement of the whole river to the close of the fiscal year ending June 30, 1892, were $117,542.79.

The amount (estimated) required to complete existing project, $693,868.63. Amount that can be profitably expended in next fiscal year, $35,000.

COMMERCE.

It is claimed by those interested in the Minnesota Valley that, were the improvements extended by the construction of locks and dams, steamboats and barges would navigate the river and carry much of the freight that now depends upon rail for transportation.

WABASH RIVER, INDIANA AND ILLINOIS, ABOVE VINCENNES.

The Wabash River rises in Mercer County, Ohio, and after flowing through a country unsurpassed in fertility and agricultural richness for over 500 miles, for 200 of which it forms the boundary between Illinois and Indiana, it enters the Ohio River at the southwest extremity of Indiana. On its banks are situated the cities of Huntington, Logansport, Covington, Terre Haute, Vincennes, Lafayette, and Peru.

The project for the improvement of the river above Vincennes embraces that portion from Vincennes to Terre Haute, and consists in the removal of such obstructions as exist, closing chutes, construction of wing dams, and dredging where necessary. This work has been of great service to navigation, but will have to be continued to materially benefit the commerce of the river.

The channel has been cleared of the most dangerous snags in about one-half of the distance from Vincennes, Ind., to Terre Haute, Ind., 688 snags, with a total weight of about 3,870 tons, being removed and cut up in this work. During the ensuing year it is proposed to resume the work at the first opportunity and clear the balance of the channel up to Terre Haute.

The amount expended on this section of the river to June 30, 1893, was $78,237.66.

The amount (estimated) required to complete existing project, $15,000. This amount can be profitably expended in ensuing fiscal year.

WABASH RIVER, INDIANA AND ILLINOIS, BELOW VINCENNES.

The first appropriation for this work was in 1872, and the project for work aims at securing a 3½-foot low-water channel by excavating through rocky and sandy shoals, constructing dikes and dams to close secondary channels or contract the flow where necessary, removing snags, and the construction of a lock and dam about 2½ miles above Mount Carmel, Ill., for removing the impassable obstructions to navigation extending a distance of about 10 miles, and known as the Grand Rapids.

At the time improvements were commenced navigation was seriously interfered with by snags, logs, shoals, and leaning timber.

The total amount expended on this part of the river to June 30, 1893, was $643,824.33.

The principal work during the past year had for its object the construction of the dam at Grand Rapids, near Mount Carmel, Ill. Con-

tract for supplying about 1,000,000 feet, B. M., of oak timber for the cribwork of the proposed structure, at a total cost of $22,407.84 was made, and its delivery is now in progress. About 10,000 cubic yards of stone required for filling the cribwork has been quarried and placed in convenient position for transfer into the dam.

The completion of the dam will reestablish navigation over the Grand Rapids, which has heretofore been an insuperable obstacle, except during periods of high water. But low-water navigation from that place to the mouth of the river will remain impossible until extensive repairs are made to the works heretofore built on that section, and which have now become almost useless because of damage by ice and freshets. Ten thousand dollars is required to dredge the approaches to the new lock at Grand Rapids and to construct wing walls leading thereto and below.

Amount (estimated) required to complete existing project, $40,000. This amount can be profitably expended in ensuing fiscal year.

COMMERCE.

Comparative statement of commerce, Wabash River, above and below Vincennes.

Years.	Tons.	Approximate value.	Years.	Tons.	Approximate value.
1887	122,729	$1,817,947.00	1891	103,415	$1,162,299.00
1888	58,014	535,006.00	1892	122,535	2,037,242.40
1889	106,513	1,573,698.00	1893	57,656	414,761.00
1890	100,443	641,107.00			

The falling off in freights is due to the bad crops.

WHITE RIVER, INDIANA.

White River is a tributary of the Wabash, flowing into it at Mount Carmel, about 25 miles below Vincennes. On the west fork of this river are located the cities of Indianapolis, Muncie, and Anderson. The White River valley is very rich in agricultural products, and in addition possesses many valuable coal fields, which are only beginning to be worked.

The present project of improvement aims at obtaining a depth of 3½ feet at low water between the mouth of the river at Hazelton, Ill., at which place a railroad bridge formerly constituted a total obstruction to navigation; this bridge has been modified during the past year, and is now provided with a suitable draw.

The principal natural obstruction on this portion of the river was a rock ledge about 2½ miles above its mouth, known as Kelly Ripple; a channel has been excavated through the ledge, the excavated material being used to form dikes on the sides of the channel. Some additional excavation at the head of the cut remains to be done in order to complete the improvement. The river is badly obstructed by snags, which should be removed.

Operations during the past year were limited to the removal of snags. When this has been done all the dams heretofore built on the river should be repaired and channels that had been made through bars and shoals should be redredged, in order to restore the river to the condition in which it was prior to the suspension of operations, as directed by Congress in the act of August 11, 1888.

The amount expended on this river to June 30, 1893, was $104,812.94.

The amount (estimated) required to complete the project, $7,500. This amount can be profitably expended in ensuing fiscal year.

COMMERCE.

Comparative statement of commerce, White River, Indiana.

Year.	Tons.	Approximate value.	Year.	Tons.	Approximate value.
1887	12,650	$181,000	1891	15,632	$93,150
1888	6,400	71,145	1892	23,130	174,000
1889	27,000	137,950	1893	9,393	68,000
1890	29,409	256,330			

CALUMET RIVER, ILLINOIS AND INDIANA.

This river empties into Lake Michigan at South Chicago, the lower portion of it forming a part of Calumet Harbor, through which the commerce of the lakes is afforded entrance to the river and thus to the interior part of Illinois and Indiana.

The object of this improvement, so far as at present projected, is to secure a channel 200 feet in width and 16 feet in depth below low-water plane in Lake Michigan, from the mouth of the Calumet River at Calumet Harbor, Illinois, to one-half mile east of Hammond, Ind., with a view to increasing the facilities for handling the growing commerce of this region, and also to aid in providing means for the better accommodation of much of the commerce of Chicago River, which is now very much crowded. The original depth of navigation in this river varied from 6 to 10 feet.

This river is rapidly growing in importance and its improvement is greatly stimulating manufacturing enterprises, the commerce of the river and harbor increasing at the rate of about 30 per cent per annum each year since the improvement began.

As this river and lakes connected with it form a very valuable system of navigation, and as work now contemplated by the city of Chicago may possibly diminish the value of the Chicago River as a navigable stream, and consequently increase the importance of the Calumet River, it is growing more and more worthy of improvement by the General Government.

The United States has secured the riparian rights along the river from its mouth to its forks, and should not only continue its improvement, but prevent all structures and uses that may diminish its value as a free public highway.

The amount expended by the United States to the close of the fiscal year ending June 30, 1893, is $181,868.83, of which $155,772.78 has been expended below the Forks of the Calumet, including $5,000 paid for legal expenses in securing rights of way and releases from damages due the proposed improvement, required by the act of July 5, 1884, and $20,096.05 for work between the Forks of the Calumet River and one-half mile east of Hammond, Ind.

The total length of channel dredged is 3½ miles. Dredging is now going on.

The annual fill, due to rains and floods in the Calumet River and the waste due to habitation, rapidly reduces the depths secured by dredging in this river, and it seems advisable that the appropriations made by Congress should be distinctly specified, whether intended to prosecute

the work or for maintaining depths in the improved section. Without dredging at frequent intervals the improved channel will revert to the original discharge area or capacity.

The amount (estimated) required to complete existing project, $745,000. Amount that can be profitably expended in next fiscal year, $200,000.

For commercial statistics, see Calumet Harbor.

ILLINOIS RIVER, ILLINOIS.

The ultimate object of this improvement is to furnish a through route of transportation by water from the southern end of Lake Michigan to the Mississippi River of sufficient capacity for its navigation by the largest class of Mississippi River steamboats that can reach the mouth of the Illinois River.

The present project contemplates the extension of the work heretofore done by the State of Illinois from the mouth of Copperas Creek to the Mississippi River, a distance of about 135 miles, which project includes the building of two locks 350 feet long between miter sills, 75 feet in width of lock chamber, with 7 feet of water over the miter sills at low-water level of 1879, and dredging the channel where necessary to attain 7 feet depth at low water in the pools thus created.

The sites selected for the two locks are one at Kampsville, 31 miles above the mouth of the Illinois, the other at Lagrange, 79 miles above the mouth of the river.

The State of Illinois, aided by the United States, has executed part of the project by the construction of two locks of the dimensions above stated, one at Henry and one at Copperas Creek, respectively, completing, except dredging, that part of the improvement, between La Salle, Ill., and the mouth of Copperas Creek. Seven hundred and forty-seven thousand seven hundred and forty-seven dollars was expended by the State of Illinois.

The amount expended by the United States to June 30, 1892, was $1,145,886.56.

The Lagrange lock and dam are completed and in use. The lock and dam at Kampsville are practically completed.

The dredging of the bars throughout the pools in the Illinois River to 7 feet in depth is now practically all that is to be done to complete the project embarked upon by Congress. This improvement will carry 7 feet to Copperas Creek Lock, above which to La Salle there may be 6 feet by further dredging and 7 feet at low water by use of temporary flush boards on the dams from Copperas Creek to La Salle.

This stretch of 77 miles is in control of the State of Illinois, as well as the connection with Lake Michigan, approximately 100 miles in length, between La Salle and Chicago River, which is now occupied by a small canal with locks 18 by 110 feet in dimensions, with available depth about 5 feet, with 6 feet a maximum possibility over miter sills and in canal.

It seems now a proper time for Congress to consider the question of not only completing the improvement of the Illinois River over the section assumed by it for improvement, but also the question of the extension of this navigation to Lake Michigan, without which the improvement already made is simply local and of no consequence.

The amount (estimated) required to complete existing project $112,000. The entire amount can be profitably expended in next fiscal year.

COMMERCE.

Receipts and shipments, in tons, via Illinois River, at St. Louis, Mo., 1892.

Month.	Receipts.	Shipments.	Month.	Receipts.	Shipments.
January	.....	.....	August	2,500	630
February	380	35	September	1,605	950
March	3,615	1,140	October	1,770	720
April	22,870	485	November	1,270	820
May	7,350	830	December	230	.....
June	4,405	1,240			
July	3,525	905	Total	49,520	7,755

Comparative statement of tonnage passing La Grange Lock for the fiscal years ending June 30, 1892, and June 30, 1893.

	Lockages.	Steamboats.	Barges.	Rafts.	Registered tonnage.	Freight.	Passengers.	Stock.	Logs.
1892.						*Tons.*		*Head.*	*Feet, B. M.*
Through the lock	218	174	114	.....	85,015.91	35,599	973	219	.....
Over the dam	.....	91	53	.....	53,654.29	6,914	355	.....	.....
1893.									
Through the lock	178	141	103	8	78,541.38	36,274	1,770	244	171,000
Over the dam	.....	142	80	1	100,253.54	16,175	306	.....	20,000

ILLINOIS AND MISSISSIPPI CANAL.

The canal is designed as a cut-off or short route from the Upper Mississippi to Lake Michigan in connection with the present existing water lines, or with improved routes of greater capacity that have been contemplated for years.

The existing route is (1) via Illinois and Mississippi Canal 97 miles to La Salle; (2) Illinois River from La Salle to its mouth at the Mississippi River, 223 miles; (3) mouth of the Illinois to Rock River 287 miles.

The present water route from the Chicago at Bridgeport to the mouth of Rock River is, as shown, 607 miles, while by way of the proposed Illinois and Mississippi Canal it will be 183 miles only, a saving in distance from Lake Michigan by water to all points on the Mississippi River above the mouth of Rock River of 419 miles over existing water routes. The route via the proposed canal will be shorter than via the Illinois River to all points on the Mississippi River above a point 78 miles by water above the mouth of the Illinois, and 209 miles below the mouth of Rock River. Above the mouth of Rock River to St. Paul are 401 miles of river navigation, so that the proposed canal as a cut-off will shorten the distance from Lake Michigan by water to all points along the upper Mississippi River for 610 miles of its length.

The Illinois River for 14 miles below La Salle forms one link in the proposed water route, but the rest of the distance, 97 miles from La Salle to Chicago, the route is continued by the Illinois and Michigan Canal, a work of much less capacity than the proposed canal. Boats of the full capacity of the locks of the Illinois and Mississippi Canal must stop at La Salle and transfer cargo to the less capacious Illinois and Michigan Canal.

To secure, therefore, the full benefits of the proposed canal the water route from Chicago to La Salle must be enlarged or the capacious chan-

nel now being constructed on the lower Illinois River to be extended to Chicago via the Illinois and Desplaines Valley and a cut across the Chicago divide. Without such works the Illinois and Mississippi Canal will be of comparatively small significance. The canal constructed even on the present basis will necessarily modify, reduce, and regulate freights moving between upper Mississippi River points and Lake Michigan, and its construction be justified upon the present basis. Its utility will, however, be gauged by the capacity of the inferior Illinois and Michigan Canal until the capacity of the latter is made at least equal to that of the proposed canal.

The canal is located upon the route approved by the Secretary of War, October 27, 1888, from the Illinois River, about 1¾ miles above the town of Hennepin, at the great bend of the Illinois River, thence via Bureau Creek Valley to Rock River at Penney Slough, thence by slackwater and a short canal around the lower rapids in Rock River to its mouth. The canal is to be 80 feet wide at the water surface, 7 feet deep, and with locks 170 feet in length, 35 feet in width of lock chamber.

The river and harbor act of September 19, 1890, made the first appropriation for the construction of this canal, and directed work to be begun by the construction of one of the locks and dams in Rock River.

Western section.—The right of way for the section of the canal 5 miles or less in length around the Lower Rapids of Rock River having been acquired, contracts were made during the fiscal year for constructing 3 miles or less of the canal trunk, and for preparing the foundations of three locks. The work was carried on as flood and weather permitted. Two of the three lock pits and foundations were completed, and about 300,000 cubic yards of earthwork in the canal trunk excavated or placed in embankment. The third lock pit, due to failure of the contractor, is partially completed.

By hired labor three of the four abutments for the dams across the two arms of Rock River, at the head of the rapids, were constructed of artificial stone; the foundation of the lock walls at Guard Lock prepared and the artificial stone head and tail bay floors and miter sills at Guard Lock laid; a large culvert under the canal below the lock begun; about 50,000 cubic yards of earth and stone excavation and embankment completed; the necessary temporary storehouses, etc., built, and plant and material collected for the prosecution of the work.

Eastern section.—A survey party has been employed for part of the fiscal year in definitely locating the section of the canal from the summit level to the Illinois River, making legal descriptions of the lands required for right of way, securing abstracts of title, and obtaining offers for voluntary sale and purchase of such lands.

This section of the canal has been staked out upon the ground, and the descriptions, plats, abstracts of title, and written options for the sale and purchase of the lands required are well along. A party is engaged in running lines from the feeder junction to Rock River with a view to ascertaining the best location for that part of the canal.

Nothing has been done at the feeder line. It is expected as fast as they can be prepared the necessary plats and descriptions of lands required for right of way will be placed in the hands of the officers of the Department of Justice for obtaining the necessary titles.

It is proposed to spend the funds now on hand to the completion of the improvement of the canal around the lower rapids of Rock River; to the purchase of the right of way for the eastern section and beginning work thereon, and to locating the canal from the feeder junction to Rock River. The funds asked for will be applied to continuing the

location of the canal and feeder, to purchase of right of way, and to carry on the work of construction.

The amount (estimated) required to complete existing project, $5,925,960; the amount that can be profitably expended in fiscal year ending June 30, 1895, $500,000.

COMMERCE.

The commercial advantages of this route have been many times presented to Congress, notably by Maj. W. H. H. Benyaurd, Corps of Engigeers, in the Annual Report of the Chief of Engineers, in 1883, by Maj. Handbury in 1886, and by the Board of Engineers specially constituted to consider its relations to commerce in 1886, in its report published in the Annual Report of the Chief of Engineers for 1887.

RESERVOIRS AT HEADWATERS OF THE MISSISSIPPI RIVER.

The object of the reservoirs is to collect surplus water, principally from the precipitation of winter, spring, and early summer, to be systematically released so as to benefit navigation upon the Mississippi River below the dams. The reservoir project is the outcome of surveys and examinations made in 1869, 1874, 1878, and 1879. From the results of these examinations, and further examinations made in 1880, the first cost of constructing reservoir dams in Minnesota and Wisconsin was placed at $1,809,083. The cost of land and other damages to result from construction and operation of the proposed dams was not included in that estimate, as they could not be predicted with any approach to accuracy.

The present project consists in constructing reservoir dams at the headwaters of the Mississippi River in Minnesota, that locality having been selected for commencing the work in consequence of an appropriation made by the river and harbor act approved June 14, 1880, for construction of a reservoir dam at Lake Winnibigoshish, Minnesota, and for other reasons, given in the annual report for 1886. By 1886 four of the reservoirs had been created.

During 1891 and 1892 the construction of a fifth reservoir at Sandy Lake was commenced, and would have been completed but for the provision in the last river and harbor act, for a navigable pass through the dam. Work is now in progress on the dam and pass.

The total expenditures on this work to the close of the fiscal year ending June 30, 1892, including examinations at proposed dam sites, land damages, amounts paid to commissioners in attempted settlements of awards to Indians, and care and maintenance of the works, were $684,042.23.

During the past year the operations have been operating completed reservoirs, continuing construction of Sandy Lake Dam, building telephone line from Sandy Lake Dam to McGregor, Minn., building jam piers, and repairing gates at Pokegama Falls Dam.

The reservoirs were operated in 1885–1892 during the seasons of low water, to the benefit of navigation on more than 165 miles of the Mississippi River, viz, between Grand Rapids and Aitkin, 130⅛ miles, and from St. Paul to some distance below the confluence of the Mississippi and St. Croix rivers.

The sum of $20,000 is asked for the completion of navigable pass in Sandy Lake Dam.

The amount (estimated) required to complete the existing project,

$1,034,683.50. Amount that can be profitably expended in next fiscal year, $51,000.

GASCONADE RIVER, MISSOURI.

Before improvement the river was greatly obstructed by snags, logs, and leaning timber, which materially interfered with its navigation.

The improvement of this stream has consisted in the removal of obstructions to navigation in the shape of leaning timber, snags, stumps, etc., and the construction of low wing dams, to facilitate the passage of boats over the shoals during low stages of water.

The work was begun in 1880, and has been continued when funds were available up to the present time.

The estimated cost of the improvement was $50,000, but as new obstructions are continually forming, it will require appropriations from time to time to keep the channel open at low water after the principal work has been done.

Amount expended to July 1, 1892, $44,689.51, which resulted in putting the river from its mouth to Arlington, 138 miles, in good navigable condition, but the high water of that year carried many snags into the river that afterwards had to be removed.

The operations for the past fiscal year consisted in removing channel and bank obstructions from the mouth of the river to the head of Pryors Mill Chute, and in constructing and repairing dams at that chute, Bocks Bar, Hensley Shoal, and at Peckerwood. The work was done by hired labor.

Amount expended during the fiscal year ending June 30, 1893, $2,949.89, resulting in further benefit to navigation.

Amount that can be profitably expended in fiscal year ending June 30, 1895, $10,000 in continuing the removal of obstruction and in repairing and building wing dams.

COMMERCE.

Articles.	1890.	1891.	1892.
	Tons.	*Tons.*	*Tons.*
Hay, grain, seeds, etc	2,658	4,035	1,547
Lumber, logs, wood, railway ties, etc	22,806	19,646	10,626
Live stock	209	425	416
Produce	5	67	80
Salt	28	29	23
Iron, nails, etc	23	3	4
Farm machinery	115	37	30
General merchandise	239	216	203
Total	26,083	24,458	12,929

Four steamboats were engaged in carrying the above freight. The improvement has been of great benefit to the people engaged in the lumber trade.

OSAGE RIVER, MISSOURI.

The Osage River rises in the eastern part of Kansas, and, after flowing in the generally eastward direction for about 500 miles, enters the Missouri River about 9 miles below Jefferson City. Originally navigation in this river was rendered difficult by reason of numerous snags and other obstructions, and at times suspended, owing to insufficient depth of water over shoal crossings.

The Osage Valley derives its chief importance from the richness of its vast mineral deposits. Rich banks of iron and valuable veins of lead and coal are found almost every day. All this vast wealth is now unavailable for want of transportation, and it seems to be the province of a paternal Government to assist in bringing these great necessaries of life (iron and coal) into market, whereby the whole country would be benefited. The principal minerals are iron, coal, lead, buhrstone, marble, grit, and kaolin.

The project for improvement of this stream, adopted in 1871, has consisted in removal of obstructions to navigation, as snags and leaning timber, and in deepening channels over shoals by means of dredging and construction of cross and wing dams, to concentrate the flow of water over shoal places. The first efforts were expended in an attempt to deepen the water over the shoals by dredging. After this the method consisted in construction of wing dams and training walls, to regulate the width of waterway for the low-water discharge of the river. Snags and other obstructions found in the channel were also removed, and leaning timber was cut from the banks. The construction of a lock and dam near the mouth of the river was authorized by the river and harbor act of September 19, 1890.

The amount expended to June 30, 1892, was $211,701.72. It resulted in benefiting the navigation from its mouth to Osceola, Mo., a distance of about 230 miles. The lower 60 miles of the river was the most benefited.

The work during the fiscal year ending June 30, 1893, put the river in good navigable condition from its mouth to Grand River.

New obstructions may be expected from time to time with each rise and fall in the river, and will require removal.

The work done has been of great benefit to the navigation of the river, rendering it safer and also enabling steamboats to navigate it at lower stages of water than formerly, and tending to prolong the boating seasons.

The amount (estimated) required to complete the existing improvement is $110,000. Amount that can be profitably expended in fiscal year ending June 30, 1895, $65,000, $55,000 for constructing lock, and $10,000 in removal of obstructions, repairs, and in building wing dams, where necessary.

COMMERCE.

Five steamboats plied this stream during the year 1892. Below is given a statement of the commerce for three years:

Articles.	1890.	1891.	1892.
	Tons.	*Tons.*	*Tons.*
Hay, grain, seed, etc	5,118	6,135	5,471
Lumber, logs, wood, railway ties, etc	86,349	77,195	69,721
Live stock	766	957	739
Produce	319	527	182
Salt	482	602	281
Barytes	1,710	2,775	1,200
Iron, nails, etc	408	510	67
Farm machinery	453	588	83
General merchandise	1,408	1,760	1,536
Total	97,013	91,049	79,280

MISSOURI RIVER BETWEEN THE GREAT FALLS, MONTANA, AND SIOUX CITY, IOWA.

Between Fort Benton, Mont., the head of navigation, and the Great Falls, 37 miles above, the river is seriously obstructed by rocks and has a steep slope. No work has been done upon it and none is proposed.

Between Fort Benton and Carroll, Mont., the channel was originally obstructed by bowlders, short turns, and steep slopes. On many bars there was insufficient low-water depth for boats drawing 30 inches. This stretch is 168 miles long and is called the "Rocky River." The original project called for the removal of bowlders. It was extended to include dredging and the building of cut-off and wing dams.

Up to June 30, 1893, $365,930.61 had been expended on the present project for the Rocky River. The worst bowlders had been removed, dams had been built at various points, and some dredging had been done. The channel had been deepened to 36 inches at the improved places except at extreme low water.

Before the adoption of the above-named project, work had been done on the river above and below the Great Falls under an appropriation of $160,000 for improving the Missouri River above the mouth of the Yellowstone.

The part done on the Rocky River consisted of dam construction and rock removal.

During the year ending June 30, 1892, work on the Rocky River had been suspended, as there appeared no likelihood of boats running there during the approaching season. The plant has been cared for and kept in repair.

Below Carroll, Mont., the river is known as the "Sandy River." From there down it becomes more and more unstable and carries more and more sediment. The banks in the bottoms cave and numerous shoals exist. Floods and ice gorges occasionally cause cut-offs or radical shifting of the channel. Originally the principal difficulties met with by navigation were due to the bars, snags, and instability of the channel. The river was available for boats drawing 30 inches, if skillfully piloted.

The original project for the general improvement contemplated the removal of snags and other obstructions, and the completion of a detailed survey with publication of charts. The construction of an ice harbor at Rockhaven was subsequently added. In 1878 to 1882 some work of regulation was done near Vermillion, S. Dak. None has since been undertaken.

On June 30, 1892, the snagging fleet consisted of one steel-hulled steamer, one wooden-hulled steamer, and one steel-hulled scow, all quite proper appliances for the work. During the year ending June 30, 1893, these boats removed 684 snags, 53 miscellaneous obstructions, and sluiced several bad bars. The fleet has been extensively repaired during the year, and the scow is now fitting with steam-propelling machinery.

The removal of many dangerous obstructions renders the channel more available for navigation than it was originally, but no attempt has been made to permanently deepen or rectify it.

Up to June 30, 1892, the river survey parties had completed the primary leveling to Fairbank, S. Dak., the tertiary triangulation, hydrography, and shore line to Cannonball, N. Dak., and the triangulation and bank topography to Fairbank.

During the year the field work of the survey was nearly completed.

There remains only the duplication of the primary levels for a distance of 267 miles, the shore-line topography and hydrography for a distance of 15 miles, and the topography of the bottom land for a distance of 94 miles.

The plotters during the year have finished 59 detail charts and 8½ small-scale charts; and have partially finished 69 detail charts and 1 small-scale chart. Thirteen editions of the detail charts and proofs of 2 others have been received from the printer.

On June 30, 1892, the elevation for the ice harbor had been surveyed.

The plans are now complete. It is hoped to do the greater part of the work in the autumn.

The work of the snag boats is of more service than any other possible with the same expenditure of money. It will remain necessary until the channel has been permanently fixed. So long as the river is allowed to shift and cut its banks as it now does it will continue to uncover buried obstructions and to cause new ones. So important and indispensable a work should not be left to the hazard of annual appropriations. The recommendation of last year is renewed, that the least estimate, $50,000 per annum for the removal of snags and other obstructions and for temporary improvement at the shoalest channels, be made as a separate and continuous appropriation. This was done in the case of the Upper Mississippi and the Ohio rivers.

The engineer in charge recommends the following expenditures for fiscal year ending June 30, 1895:

Rectification of river at Pierre and Fort Pierre	$150,000
One-half rectification of and permanent channel improvement of 25 miles of Bismarck Reach	198,000
One-fourth rectification and permanent channel improvement of Yankton-Sioux City Reach, 130 miles	514,000
Plant and maintenance for one year	210,000
Maintenance of ice harbor for one year	5,000
Operating snag boats for one year	50,000
Total	1,127,000

The amount required to complete the existing project is $175,000.

COMMERCIAL STATISTICS.

River tonnage between Sioux City, Iowa, and Fort Benton, Mont. (exclusive of live stock).

	Tons.		Tons.
1887	13,961	1890	13,326
1888	12,895	1891	13,055
1889	16,724	1892	15,182

Traffic by river reaches.

Year.	River reaches between—	Package and bulk freight.	Passengers.	Live stock.
		Tons.	*No.*	*Head.*
1890	Sioux City and Bismarck	9,735	4,322	2,974
	Bismarck and Fort Buford	2,467	184	43
	Fort Buford and Fort Benton	1,124	62	43
1891	Sioux City and Bismarck	10,410	1,749	4,683
	Bismarck and Fort Buford	2,645	130	59
1892	Sioux City and Pierre	2,634	32	6,043
	Pierre and Bismarck	7,247	177	2,315
	Bismarck and Fort Buford	5,301	278	300

SACRAMENTO AND FEATHER RIVERS, CALIFORNIA.

The Sacramento River is navigable as far as Red Bluff, about 275 miles from its mouth. During the last ten years, however, since the railroads have been in operation, boats have not gone above McIntosh Landing, about 45 miles below, until the present year, when they went as far as Tehama, about 16 miles below Red Bluff.

Feather River is the largest tributary of the Sacramento and empties into the latter about 16 miles above the city of Sacramento. It is navigable for a distance of about 30 miles, up to its confluence with the Yuba River, at the town of Marysville.

Before improvement navigation in these rivers was dangerous and difficult on account of numerous snags, shallow bars, and rapids. In 1874 a project was adopted having for its object the temporary improvement of the low water channels by removal of snags, building of wing dams to concentrate currents, and the scraping of bars. Work under this project has been carried on during every working season, and together with the closure of several breaks in the banks, which threatened to injure navigation, cost up to June 30, 1892, $481,680.99. The results of the work were to secure and maintain on the Sacramento River a good navigable channel from McIntosh Landing down to Butte City for boats drawing 2½ feet; from that point to Sacramento 4 feet of water, and below Sacramento a low-water channel with a least depth of 5 feet has been secured. On the Feather River there is a channel from Marysville, the head of navigation, to the mouth for boats and barges drawing 2 feet of water.

At the beginning of the fiscal year the snag boat was at work in the upper Sacramento River, and continued so until November 5, when the channel had been put in good order as far up as Tehama, 29 miles above McIntosh Landing. This opened up 29 miles of river that had not been used by steamboats for over ten years, and gave a channel from Tehama to McIntosh for boats drawing 2½ feet of water. The other channel depths in the river below were maintained as in former years. The cost of the snagging was $13,121.26, and was of the greatest benefit to commerce, in fact without it navigation in the upper Sacramento River could not be maintained.

During this last fiscal year the project was increased to include the closure of Jacob Slough, a large crevasse just above the city of Sacramento; the maintenance of navigation on the Feather River by means of wing dams to remove shoals, and the treatment of the Yuba River, near and above Maryville. Under this project surveys have been made to ascertain the exact conditions existing. Bids were received and opened at the end of the fiscal year for the closure of Jacob Slough, and a project has been made and approved for cutting a new mouth for the Yuba River. No actual work has yet been done, so no results have been attained.

The total amount spent on the improvement of these rivers during the last fiscal year has been $22,856.49, and the result has been of great benefit to the large and increasing commerce of the country adjacent to the rivers. The improvements done on these rivers have resulted in greatly reducing the rates of freight and insurance.

It is estimated that $345,000 can be profitably expended in improving these waterways during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Three steamboat lines are engaged in navigating these streams. They report the following tonnage transported by them respectively during the last fiscal year:

		Tons.
Sacramento Transportation Company		267,183
California Transportation Company		104,000
Southern Pacific Company:		
On Sacramento River	95,160	
On Feather River	17,430	
		112,590
Total		483,773

SAN JOAQUIN RIVER, CALIFORNIA.

When a project was first adopted for the improvement of this river, in 1877, there was only a low-water channel to Stockton of about 6 feet in depth, and this was gradually deteriorating. The upper river, above Stockton, was navigable for about six months in the year for light-draft boats. The project first adopted was for a channel 9 feet deep to Stockton, secured by dredging the shoal places both in the river and Stockton Channel; the making of cut-offs to straighten the river between Stockton and the mouth; the removal of snags, scraping of bars, and building small wing dams in the upper river to increase the depth and prolong the boating season. The closure, or partial closure, of several crevasses or sloughs that injured navigation by the amount of water they took from the river has since been added to the project.

At the close of the fiscal year ending June 30, 1892, there had been expended on this project $257,780.55. This expenditure had secured and maintained, severally, a 9-foot channel to Stockton all the year round; had straightened the river by 4 cut-offs, 3 near Devils Elbow and 1 at Head Reach, and made navigation between the cities of San Francisco and Stockton easy and safe. In the upper river Laird Slough and Paradise Cut had been partially closed by dams, but the length of the boating season had not been materially prolonged, as in the low stages of the river, except for a few miles above Stockton Channel, there is not water enough for navigation purposes.

During the fiscal year ending June 30, 1893, the annual dredging necessary to maintain the 9-foot channel to Stockton has been carried on with most successful results, and navigation has been uninterrupted. The dams both at Paradise Cut and Laird Slough were flanked by the heavy floods and were repaired. The amount spent on the improvements during the fiscal year was $22,925.30, and the results were of great benefit to the commerce of the river.

The right of way necessary for a double cut-off in the narrows, just below Stockton Channel, has been acquired, and bids for doing the work will be opened early in the next fiscal year. At Twenty-one Mile Slough the right of way has also been acquired for a cut-off, which will be shortly made. In both these cases the right of way was acquired free of expense to the United States Government.

The following is a list, in the order of importance, of the works needed for the improvement of this river, together with the estimated cost of the several items, aggregating $152,750, which amount, it is estimated, can be advantageously expended during the ensuing fiscal year:

Dredging to maintain 9 feet depth to Stockton	$35,000
Making cut-off at Twenty-one Mile Slough	65,000
Increasing cut-off at Head Reach in width, depth, or both	37,750
Removing obstruction near county bridge, above Stockton Channel	5,000
Snagging, wing dams, etc	10,000
Total	152,750

COMMERCIAL STATISTICS.

The following is a statement of the trade of the California Navigation and Improvement Company's boats for the year ending May 31, 1893:

	Tons.		Tons.
Wheat	72,000	Produce	20,000
Lumber	90,000	Raw materials for manufacturing purposes	15,000
Coal	30,000		
Mill stuffs	71,000		
Miscellaneous freight and manufactured products	55,000	Total	353,000

Passengers, 60,000.

The following is a statement of the freight carried by the Union Transportation Company up to May 31, 1893:

	Tons.		Tons.
Wheat, rye, and barley	10,000	Mill stuffs	12,000
Coal	3,000		
Produce	1,000	Total	42,000
General merchandise	16,000		

Passengers, 30,000.

Besides the above freight, a very large quantity is carried on the San Joaquin River by small schooners, not only between San Francisco and Stockton, but also between intermediate points on the river. Many attempts have been made to collect accurate statistics of this trade, but it has been found impossible to do so.

PETALUMA CREEK, CALIFORNIA.

Petaluma Creek, which is really an estuary of San Pablo Bay, extending up to the town of Petaluma, some 16 miles, is the outlet for a large amount of freight.

In its original condition this creek was very crooked and at low tide its bed, in places, was bare. In 1880 a project was adopted for its improvement by which it was designed to obtain by dredging a channel 50 feet wide by 3 feet deep at low water. For this purpose $35,892.95 was expended up to June 30, 1892, in dredging in the channel and making cut-offs. The channel proposed was obtained and maintained. Much of this work consisted of redredging, as owing to the adjacent country being in a high state of cultivation the dredged channel constantly refills.

The river and harbor act of 1892 appropriated $10,000 for this work, and to determine where the greatest need for dredging existed a survey of the creek was made and submitted to the War Department, together with a project for the expenditure of the funds. It was proposed to carry on work with the United States dredge usually occupied in the San Joaquin River, but at this time idle on account of high water. Accordingly the dredge was put in working order and taken to Petaluma Creek, where it commenced work on May 2, 1893, at Haystack Landing, 3 miles below the town of Petaluma, working upstream. By June 30 a channel 5,107 feet long by 50 feet wide, 3 to 4 feet deep at low water, had been dug, and 37,171 cubic yards of material excavated and placed on the banks 50 to 100 feet back from the cut, at a cost of $4,184.03. The work is still in progress.

The result of the work has been of great benefit to the navigation interests and no serious detentions have been reported of late years. As stated above, the channel is continually refilling, and to keep it open dredging must be done every two years at an estimated cost of $4,000.

It is estimated that $53,543 can be profitably expended improving this harbor during the ensuing fiscal year.

COMMERCIAL STATISTICS.

	Tons.		Tons.
Grain	27,115	Lumber	5,494
Coal	4,467	Mill stuff	11,220
Building material	2,810	Live stock	2,399
Produce	23,807	Miscellaneous	30,968
Cannery products	1,865		
Iron and pipe	500	Total	110,645

Passengers, 8,126.

MOKELUMNE RIVER, CALIFORNIA.

This river is a tributary of the San Joaquin, which it enters about 20 miles above the mouth of the latter. The San Joaquin and connecting waters afford good navigation from the mouth of the Mokelumne to San Francisco.

Before improvement navigation in this river was difficult and dangerous on account of numerous bad snags and overhanging trees, and the object of the original project, adopted in 1884, was the removal of such as obstructed navigation.

The river was cleaned out to the head of navigation in 1884, 1885, 1886, 1887, and 1888, and navigation was made easy and safe. It has since deteriorated, but as the act of 1892, appropriating funds for this river, provided that none should be expended until a drainage canal, dug by private parties near New Hope Landing, should be closed free of expense to the Government, the commencement of the work has been delayed. This canal has now been closed and the improvements will be resumed.

There was expended up to June 30, 1892, on the improvement of this river, $12,457.62, and this resulted in great benefits to navigation. No work has been done during this last fiscal year.

The Chief of Engineers submits:

"The improvements now needed for the safe navigation of this river are the removal of the snags and trees obstructing navigation, the removal of a point of land near New Hope Landing, and also a shoal formed by the drainage canal. The estimated cost of these works is $9,100, and they could all be done in one fiscal year."

COMMERCE.

The statistics of trade furnished by the California Transportation Company for the year from June 1, 1892, to May 31, 1893, are as follows:

	Tons.
Freight, principally grain	47,000
Passengers	3,543

This commerce is carried on one stern-wheel steamer, the *Constance* (385 tons, draft light, 2½ feet, loaded 6 feet), which makes one to three round trips per week.

The steamer *Ellen* (91 tons) also made a few trips into the Mokelumne River during the wheat season, and furnishes the following statistics:

	Tons.
Wheat	3,200
Other freight	50
Total	3,250

NAPA RIVER, CALIFORNIA.

The project is to clear the river of snags and the banks of overhanging trees interfering with navigation, and to dredge the bars between Carr Bend and Vernon Mills in the immediate vicinity of Napa.

Work upon this improvement was commenced in 1889. The river was cleared of snags, and the channel was dredged from Carr Bend to the highway bridge at Third street. The work completed two years ago left the river in good boating condition. It is not considered that any improvement effected can be permanent. Floods in the river caused by the winter rains bring down large quantities of detritus which lodges in the river and forms shoals. The channel, dredged two years ago, has been partially refilled from material brought down during a heavy freshet last December.

The total amount appropriated for this improvement is $17,500, and the total amount expended is $17,480.65.

No work was done during the past season.

It is estimated that $10,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

	1884.	1892.
Merchandise, general, received and shipped.....tons..	22,800	15,280
Coal received.....do...	5,000	5,550
Hay shipped.....do...	2,000	3,500
Grain, feed, and flour received and shipped.....do...	3,000	8,250
Lumber received.....do...	18,333	6,935
Wine received and shipped.....do...	7,500	18,175
Miscellaneous freight received and shipped.....do...	5,936	4,525
Total.....	64,569	62,215
Steamers.....	2	2
Tonnage.....	176	637
Trips by steamers.....	.....	365

UPPER COLUMBIA AND SNAKE RIVERS, OREGON AND WASHINGTON.

The Upper Columbia and Snake form a continuous line of navigable river, but broken by many rapids which render navigation difficult and dangerous. These rapids are in nearly every instance caused by rocky bars with occasional bowlders. The channels before improvement were crooked and narrow, the ruling depth at low water over many of the bars was 2 to 3 feet, and some were practicably impassable at low water.

The Columbia was navigable all the year, except when closed by ice; the Snake, however, was navigable only during high water, for three or four months in the spring.

Previous to 1877 $20,000 had been appropriated for the work of improvement, and had been expended in surveys and rock removal at the principal rapids.

In 1877 a project was approved which provided for the removal of bowlders and reefs, and for scraping gravel bars in the Columbia and Snake as far as Lewiston. The estimated cost was $132,000.

By the river and harbor act of 1892 the upper limit of this work was extended from Lewiston, Idaho, to Asotin, Wash., a distance of 7 miles.

The present plan of improvement is to remove bowlders, gravel bars, and rock ledges, and put in such contraction works as may be necessary.

The estimated cost of the work has not been accurately determined because of the lack of continuous and full surveys, and because, from the nature of things, it can not be, as many of the obstructions which it is necessary to remove are continually recurring.

The expenditure prior to June 30, 1892, was $142,717.27. A great deal of rock was removed, with very great benefit to navigation; boats were enabled to carry more than double their previous loads, and with greater safety.

The amount expended during the fiscal year ending June 30, 1893, was $20,248.71.

The worst rocks and reefs between Riparia and Asotin have been effectually cleared out. At two of the worst bars dikes have been partially built, which will soon be completed. They have already had a good effect in deepening the channel.

The aggregate of the appropriations is $271,000.

It is estimated that $20,000 can be profitably expended improving these waterways during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Shipping.—Steamers operated by Union Pacific Railroad upon Snake River between Riparia and Lewiston, and intermediate landings during fiscal year ending June 30, 1893, with their tonnage, draft, and amount of freight carried:

Name.	Net tonnage.	Draft (loaded).	Freight carried.
		Feet.	*Tons.*
Spokane	531.68	4	5,423
Annie Faxon	487.60	5	8,964
Almota	395.24	4½	4,977
Total			19,364

Estimated value of freight carried, $605,910.

The freight carried is almost entirely wheat and fruit out, and general merchandise into the country.

MOUTH OF COLUMBIA RIVER, OREGON.

The present project, adopted in 1884, contemplates providing a channel across the Columbia River Bar, having a depth of 30 feet at mean low tide. This is to be effected by concentrating the water flowing over the bar and increasing the resultant currents to such a degree as to procure the desired depth. The work which is now in progress is the building of a low-tide jetty, starting from Fort Stevens, on the South Cape, and extending in a westerly direction, with a slight curve to the south, out across Catslop Spit for a distance of 4½ miles, more or less, as circumstances may require, to a point about 3 miles south of Cape Disappointment.

The jetty is constructed of stone, resting upon a mattress foundation about 40 feet wide, and from 2½ to 5 feet thick.

The materials used in construction are transported over a double track tramway built for that purpose. This tramway has been extended to a point 4¼ miles from the shore, which is the outer limit of the proposed jetty.

The entire apparatus for this work is owned by the Government. The cost of its acquirement and maintenance is large.

Before the commencement of this work the channel or channels over this bar were very capricious in location and variable in depth. The

depths were usually from 19 to 21 feet, and the channels varied in number from 1 to 3.

The results thus far obtained are very marked in the manner in which it has caused Catslop Spit to be raised out of the water, checked the flow over that spit, and concentrated the scouring effect upon the bar.

Soundings made during the latter part of June, 1893, show a decided improvement during the last fiscal year. The 30-foot curves on the outside and inside of the bar on the north side of the channel are fully three-quarters of a mile nearer to each other than they were at the close of the preceding fiscal year, and at two points these curves have come together, giving depths of 30 feet over the bar at low water. The width of the 27-foot channel is now about three-quarters of a mile, and the 25-foot channel about 1½ miles. The strong southerly winds, and at many times storms, which prevailed during last winter and spring have kept the sands banked up against the mouth of the river more than would otherwise have been the case and made more work for the ebb currents to keep the channel clear.

The principal work during the year has been receiving rock from the contractors, transporting it and placing it upon the jetty, and keeping the plant in good serviceable condition.

The top of the jetty for the first 2 miles will average about the mean high-water line; for the remainder of the distance the average will be about 4 feet above the mean low-water line.

The delivery of rock was suspended in 1893 from the end of January to the end of March. Opportunity was taken of this interval of suspension to renew the stringers and caps in portions of the tramway that had decayed to such an axtent as to be dangerous to move trains over, and also to make general repairs that were much needed to the barges, tow-boats, and rolling stock of the plant.

The Chief of Engineers submits:

The estimate of the cost of this improvement, submitted with the project of the board of 1882, was $3,710,000. To March 1, 1893, there had been appropriated for the work $1,687,500. The balance then available for its further prosecution was $245,024.11. For the entire completion of the work in accordance with the project now recommended an additional appropriation of $338,180 will be required. It is scarcely necessary to call attention to the fact that under existing circumstances the completion of this work can not be long delayed without great risk of largely increasing the cost. It is, therefore, advisable that this amount be made available at as early a day as practicable.

COMMERCIAL STATISTICS.

Gross annual tonnage passing in and out over Columbia River Bar, as reported by the collectors of customs at Portland and Astoria, is 1,833,332 tons.

Table of comparative values of exports for the last ten years.

	Foreign.	Domestic.	Total foreign and domestic.
Year ending July 31—			
1883–'84	$6,638,850	$6,014,321	$12,653,171
1884–'85	5,857,057	6,699,776	12,566,833
1885–'86	7,032,026	9,480,996	16,513,022
1886–'87	6,196,722	9,507,183	15,703,905
1887–'88	5,991,990	8,788,887	14,780,877
1888–'89	6,634,989	9,562,815	16,197,804
1889–'90	4,534,441	7,868,770	12,403,211
Year ending June 30—			
1890–'91	5,806,535	8,368,605	14,175,140
1891–'92	7,725,720	8,308,775	16,034,425
1892–'93 *	5,080,070	5,937,620	11,017,690

* Statistics obtainable covering period only from June 30, 1892, to March 31, 1893.

LOWER WILLAMETTE AND COLUMBIA RIVERS, IN FRONT OF AND BELOW, PORTLAND, OREG.

Portland is the principal city of the Northwest and is located on the Willamette River, 12 miles from its entrance to the Columbia and 110 miles from the Pacific Ocean. It is at the head of deep-sea navigation on these rivers, and has a large and extensive foreign and domestic commerce.

Prior to commencement of improvements the ruling depth of the channel was about 12 feet, and at the same time the depth on the bar at the mouth of the Columbia River was from 18 to 20 feet at low water.

The original project under which improvements have been carried on, with modifications and extensions, was adopted in 1877. Some dredging work had been done previous to that time. It contemplated that a navigable low-water channel having a depth of 20 feet should be maintained by means of permanent construction to protect the banks, contract the rivers in wide places, direct the currents, and control the amount of water that should pass through sloughs having a detrimental influence upon the main channel. While these constructions were being put in place, and until their influence was fully developed, dredging was resorted to in several localities to give a temporary relief to commerce.

All these works have produced and continue to produce very beneficial effect upon the navigable channels in their vicinity.

The object of the improvement now is to make and maintain a navigable channel from the city of Portland, Oreg., to the sea, having a low-water depth of 25 feet. There is included in this reach 12 miles of the Willamette River and 98 miles of the Columbia, measured along the deep-water channel.

The amount expended by the United States on this since the adoption of the project, July 1, 1877, is $775,138.58. It appears that previous to that date $221,780.46 had been expended in various operations looking to the improvement of these rivers between Portland and the sea. The aggregate of the appropriations and allotments, including proceeds from sales of property to other appropriations up to June 30, 1893, is $1,039,745.71. The citizens of Portland, prior to the adoption of the project for obtaining the 25-foot channel, had from time to time expended considerable sums in assisting to keep open a deep channel to the sea.

On the 7th of September, 1892, the Government dipper dredge resumed operations upon Swan Island Bar, in the city of Portland, and was kept in commission until the end of the following March. At this time the Willamette had risen to a 6-foot stage, which made the water at the point where the dredging was done 28 feet deep, which is the limit at which the dredge could work. Operations were then suspended for the season.

Last season proved to be very unfavorable for dredging. There were 176 working days of eight hours each within the time that the dredge was in commission. Of this number, the equivalent of 78½ days was lost through high water, bad weather, delays on account of repairs to breakages, and removals from channel to allow vessels to pass.

The work of the dredge was confined to widening the old channel that has been dredged and redredged through Swan Island Bar. The dredging heretofore has been confined to a width of 100 feet and a low-water depth of 20 feet. The work last season consisted in widening this cut to 150 feet and digging the widened portion to a depth of 22

feet. There was removed during the season 45,887 cubic yards of material, the greater portion of which was towed in the dump scows 3 miles down the river and deposited behind the dike above St. Johns. A number of snags were also removed from the channel.

About one more month's work with the dredges would have put this locality in very good condition for passing vessels of any draft that will probably enter this port. To afford greater accommodations for vessels loading and anchoring in this part of the harbor, the dredging should be extended on both sides to the established harbor lines. It is expected, however, that the contraction of the water caused by the construction of the dam across the chute behind Swan Island, and the building of docks in this vicinity out to the harbor lines, will not only keep the dredge cut open, but gradually enlarge it.

The total expense of dredging during the last fiscal year, including repairs to dredge, etc., was $15,897.54.

The dike at Martin Island Bar, Columbia River, 2,500 feet in length, which is called for by the present project, was built by contract for the material delivered in place at a cost of $20,335.11.

The lower 1,600 feet of the dike, at St. Helens Bar, in the Columbia River and its cross dike were strengthened by additional brush and rock delivered in place under contract, the cost of which was $10,521.19. This addition to the St. Helens dike will have the effect to contract the water and keep open and enlarge the channel across the bar which, when last examined, had a low-water depth of 22 feet.

A hydraulic dredge boat, provided with propelling power and with two large rapid working centrifugal pumps and with other improved machinery and equipments, was provided at a cost of $66,000 for this work during last year for the purpose of assisting the permanent contraction works in opening the 25-foot channel required by the project.

Under the permission granted by the Secretary of War to the port of Portland commission to build dikes and do dredging, in accordance with the approved project for obtaining 25 feet depth of water from Portland to the sea, 1,300 feet of dike at Walker Island and 19,700 feet in Cathlamet Bay, in the vicinity of Snag Island, were finished, in addition to the lengths reported at the close of the previous fiscal year. The aggregate length of the dikes built in the Willamette and Columbia rivers by this commission to the end of the fiscal year ending June 30, 1893, is 43,000 feet, a little more than 8 miles. It has dredged during the year 87,150 cubic yards of material; of this amount 25,230 yards was taken from the Swan Island Bar, 5,355 from the mouth of the Willamette River, 32,630 from St. Helens Bar, and 23,935 cubic yards from Martin Island Bar.

The original estimate for procuring the 25-foot channel was $772,464. The port of Portland has expended on this project $381,107.51. In the river and harbor act approved July 13, 1892, an appropriation of $150,000 was made applicable to this purpose.

It is estimated that $153,600 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Statement of traffic on the Columbia and Lower Willamette rivers, not including deep-sea vessels, for the year ending June 30, 1893.

These figures have been collected from the various steamers and transportation companies doing business on the rivers:

	Tons.		Tons.
Passengers (1,833,789)	137,534	Coal	35,919
Grain	58,227	Wool	2,426
Lumber (172,774,380 feet)	224,607	Merchandise	613,987
Live stock	12,944		
Sheep	4,181	Total	1,089,825

WILLAMETTE RIVER ABOVE PORTLAND, OREG.

The natural channel from Portland to Oregon City, 12 miles above, was generally deep and wide. At that point there is a fall which is passed by a system of locks built by the State. Above the falls it was narrow and tortuous and much obstructed. At low water, navigation with a draft of 2½ feet was possible, but difficult, for a distance of 28 miles above the falls. Only 1 foot could be carried above.

The project for this improvement was adopted in 1878. It consists in snagging operations, bar scraping, contraction of water over shoals and rock removal, with the object of giving easy navigation for light-draft boats from Portland to Eugene City, Oreg., a distance of 172 miles. The mouth of the Yamhill River, 40 miles above Portland, was the head of an inconvenient low-water navigation in a draft of 2½ feet; only 1 foot could be carried above at the same stage.

Although navigation at stages above low water has been very much improved, there are still some bars on which at low water of last season the governing depth did not exceed 1 foot.

The total amount appropriated for this work since the adoption of the project is $151,000, not including the $3,000 allotted to the improvement of the Yamhill River, Oregon, from the appropriation of July 13, 1892.

The snagging operations during the year extended over the whole river, from Portland to Eugene City.

During the season 1,300 snags and a large quantity of overhanging trees and limbs were removed. Dams for the purpose of closing chutes and concentrating low water over shoal bars to the extent of 635 feet were built.

In the act making the last appropriation for the improvement of the upper Willamette it was provided that $3,000 should be applied to improving the Yamhill River, from its mouth up to McMinnville. As implied above, the Yamhill is an estuary of the Willamette.

About three weeks work was done in this river during August, 1892, consisting of scraping the bar at the mouth of this river and increasing the channel depth through it to 25 inches at extreme low water. This work permitted the regular steamboats, plying between Portland and Dayton, 5 miles above the mouth of the river, to continue their trips throughout the low-water season.

The crew of the snag boat removed from this reach of the river 126 snags, blasted out 2 rocks and pulled 18 piles, the remains of an old bridge at Dayton.

Work was resumed and carried on during the following October and November, during which time about 1,200 trees and snags of various

description were cut, which floated away during the next rise. In the latter part of November, in consequence of heavy rains, the stream had risen to a 12-foot stage, at which height the rapids at Lafayette were submerged sufficient to permit of boats passing above them. It was at that time in as good condition for navigation as it is possible to make it. No boats took advantage of this condition to ascend above Dayton.

The cost of this work was $1,526.22, leaving a balance of $1,473.78 from the allotment, to be yet expended.

There is a balance at the end of the fiscal year of $17,477.87 available for work on the Willamette. This is exclusive of the above-mentioned balance of the allotment for the Yamhill River.

The balance on hand will be expended in the improvement of bars and snagging operations *and* will be exhausted before the end of the present working season.

The engineer in charge of improvement submits the following in regard to the future improvement of the Upper Willamette:

If the dams which are put in to serve the temporary purpose of emergencies during low water were made stronger and more permanent, so as to resist the strong currents of the high waters, more satisfactory progress could be made in the improvement of the river. In order to provide for the immediate and urgent needs of navigation during the low-water season the amounts usually appropriated must be expended in the manner described in temporary work at many places throughout the whole reach under improvement. An appropriation of $60,000 in one sum would permit this temporary work in the bars above the Willamette Falls to be made permanent, and after that yearly appropriations of $10,000 or $12,000 would keep the river in good boating condition during low-water season.

The amount of commerce on the river, the economical prosecution of the work to be done, and the influence that the improved river would have upon the rates now paid by the farmer for transporting his products to the market would seem to justify an appropriation of at least $60,000 for the fiscal year ending June 30, 1895.

It is estimated that $60,000 will be required to complete the existing project.

COMMERCIAL STATISTICS.

Statement of Upper Willamette River traffic for year ending June 30, 1893.

The following figures are furnished by the transportation companies doing business on the rivers:

	Tons.		Tons.
Passengers (102,136)	7,660	Wool	365
Grain	14,699	Merchandise	140,868
Lumber	1,267		
Live stock	411	Total	165,270

COQUILLE RIVER, OREGON.

The mouth of the Coquille River is on the southern coast of Oregon, between Coos Bay and Port Orford. Coasters ascend to Coquille City, 28 miles, and light-draft vessels 12 miles farther. The principal industry of the valley is lumbering.

Before improvement the entrance to the Coquille River was considered very dangerous. It was by a long, tortuous, and narrow channel, skirting the south headland, and studded with rocks from beyond the bar to a distance of one-half mile inside. The depth at low water was only about 3 feet and the channel was constantly shifting. At long intervals the channel would break through the north spit and run directly out to sea just south of Rackliffe Rock, but never remained long in this position. At such times the entrance was comparatively safe and the channel was at its best.

The first plan ot improvement was to construct two parallel high-tide stone jetties, 800 feet apart, running out to sea a sufficient distance to open and maintain over the bar a channel with a least depth of 8 feet at low water; the dorth jetty starting from Rackliffe Rock and the south jetty from a point inside the entrance. Under date of May 8, 1891, the project was changed to provide for an entrance width of 600 instead of 800 feet. The estimated cost of this improvement was $164,200.

The law of 1888 authorized the expenditure of $5,000 in snagging between Coquille City and Myrtle Point; the law of 1890 authorized the expenditure, for the same purpose, of a sum not to exceed $3,000.

The cost of completing the work in accordance with the project has recently been reestimated at $180,000. The amount expended prior to June 30, 1892, was $102,299.98, of which $95,416.08 was expended on the improvement of the mouth and $6,883.90 for snagging.

For considerable periods the channel was kept straight, with a depth on the bar of 8 to 10 feet at low water. At times the winds and currents would heap sand into the channel, causing it to shoal and spread out or break away to the northward, forming a new entrance, shallow and ill directed.

The amount expended during the fiscal year ending June 30, 1893, $16,817.59, was almost entirely consumed in repairing and improving the damage and incomplete work of previous years. The results are practically the same as for the year before.

The appropriations to June 30,1893, amount to $130,000.

While the work which has already been done has been of great benefit to the Coquille, yet the full benefit of it can not be reaped until both jetties are extended out to their ends, as projected.

The engineer in charge of this work says:

> This work has always been conducted with inadequate appropriations. That this is lacking in economy is evidenced by the fact that it has been found necessary to expend most of the current appropriation in repairs to the work.

It is intended with the available funds to continue work on the south jetty, first putting the old work into thorough repair, and then, if any money is left over, to extend this jetty as far as possible.

It is estimated that $150,000 will be required to complete the existing project, and that $50,000 can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels.

Steam and sail vessels.	Number.	Aggregate tonnage.
Arrivals	67	7,546.22
Departures	69	7,751.29
Total	136	15,297.51

	Tons.	Value.
Total exports	12,354.4	$145,164.00
Total imports	2,136.4	112.788.00

UPPER COQUILLE RIVER, BETWEEN COQUILLE CITY AND MYRTLE POINT, OREG.

The main river is formed by the North, East, Middle, and South Forks, which come together in the vicinity of the town of Myrtle Point, which is 34 miles from the mouth of the river. The valley of the Lower Coquille is, perhaps, the largest and richest on the Oregon coast.

The Coquille is one of the principal streams of southern Oregon. It is navigated by coasting vessels from its mouth to Coquille City, a distance of 25 miles. This portion of the river has at times been more or less obstructed by snags, but no serious shoals have formed.

From Coquille City to Myrtle Point, a distance of 12 miles, there has always been great trouble in keeping the river open. The drainage area is densely wooded and every freshet brings down many stumps, logs, and trees. These lodge and cause deposits of sediment, forming shoals.

The plan of improvement submitted, to comply with provisions of the river and harbor act of 1890, is to remove all objectionable snags and to contract the river at certain shoals to a width of 50 feet, in order that the shoals may scour away. The estimated cost was $26,000.

Until the past fiscal year this work had been carried on with certain sums diverted from the appropriation for the mouth of the river. The act of 1888 authorized the expenditure of $5,000, and the act of 1890 the expenditure of a sum not to exceed $3,000 in snagging between Coquille City and Myrtle Point. The act of 1892 made a separate appropriation of $5,000 for this work.

The amount expended during the fiscal year ending June 30, 1893, was $5,000. A great many snags were removed, but, while this was of benefit to navigation, the upper river has been filling up with alluvium, so that its navigable capacity has not increased.

It is estimated that $21,000 will be required to complete the existing project, which amount can be profitably expended during the ensuing fiscal year.

COMMERCIAL STATISTICS.

The commerce of the Upper Coquille is accommodated by one steamboat steadily, namely, the *Alert*, 57 tons capacity, with occasional helps by the *Restless*, a steamboat of 5 tons capacity. One daily round trip is made between Coquille City and Myrtle Point, carrying passengers, freight, and United States mail.

Following is the amount of freight carried during the year between the two points:

Description of freight.	Up trips, Coquille City to Myrtle Point.	Down trips, Myrtle Point to Coquille City.
	Tons.	*Tons.*
Hardware, machinery, groceries, local supplies, etc.	520	.....
Lumber	99	.....
Wool, potatoes, butter, cheese, bacon, grain, lard, milk, chickens, and eggs.	.....	623
Total	619	623

Total tons freight carried, 1,242. Estimated value, $130,000.

MOUTH OF THE SIUSLAW RIVER, OREGON.

The Siuslaw River enters the ocean about midway between Coos Bay and Yaquina Bay, in the midst of a vast shifting sandy beach, without any headland or fixed point to determine or aid in determining the location of the entrance channel. The unconfined channel has a range of about one mile over which it wanders. The depth on the bar

varies from 5 to 12 feet at low water, and the bar channel is very variable in position and direction. At times a channel is developed inside the bar, and running nearly parallel with the coast. This channel is narrow, ill defined, and dangerous, as boats have to pass through it in the trough of the sea. At other times there are two channels.

The plan of improvement is to confine the outgoing and incoming waters between high-tide brush and stone jetties, so located as to direct the current upon the bar in a direction practically perpendicular to the coast. The north jetty will be 4,500 feet long, the south jetty 3,200 feet, and they are to converge to an entrance 600 feet wide at the crest of the bar.

The amount expended prior to June 30, 1892, was $30,417.86. The work done was of a preliminary character, and there were no results as regards improvement of the entrance. The amount expended during the fiscal year ending June 30, 1893, was $34,625.84.

The work has not progressed sufficiently far to produce any results of importance on the bar. It is, however, hoped and believed that the work so far done on the jetty will counteract the tendency of the channel to work to the north. If this be the case, it will undoubtedly result in some betterment to the channel.

The total amount of appropriation is $70,000.

The future operations with the present appropriation will consist solely of the care and protection of the plant and work. The scows will be moored at the quarry for greater safety and the plant, wharf, etc., at the mouth of the river will be left in charge of a watchman.

It is estimated that $630,000 will be required to complete the existing project, and that $50,000 can be profitably expended during the ensuing fiscal year.

COMMERCE.

During the year 1892 there were 96 arrivals and departures of vessels, of which the gross tonnage was 6,641.92 tons, an increase of 102.7 per cent over that of the preceding year. The number of passengers arriving by sea was 86, and the number of passengers departing by sea was 100. There were 170 days' delay in crossing out on account of lack of water.

Year.	Exports.		Percentage of increased tonnage.	Imports.		Percentage of increased tonnage.
	Tons.	Value.		Tons.	Value.	
1891–'92	1,620	.....	.....	761	.....	.....
1892–'93	5,236	$102,000	223.2	1,764	$100,000	131.8

River service.

During the summer, usually from June to November, a side-wheel boat, the *Coos*, makes three regular round trips weekly between Florence and Seaton, increasing the number as traffic demands. The balance of the year a smaller boat, the *Mink*, accommodates the traffic with two regular trips weekly between the same points.

No record of the freight carried is preserved, but the following is believed to be a close approximation for the year:

Steamboats.	Registered tonnage.	Passengers carried.	Freight.	Value.	Remarks.
			Tons.		
Coos	53.54	1,800	1,000	$40,000	Merchandise, milk, fresh salmon, etc.
Mink	.....	800	165	5,700	Do.
Lillian	25.52	.....	.....	.....	Principally Government towing.
Total	.....	2,600	1,165	$45,700	

GAUGING WATERS OF COLUMBIA RIVER, OREGON AND WASHINGTON.

The object of these gauges is to ascertain and keep a record of the fluctuations of the Columbia River with the view to gathering information that may be useful in works of improvement on the river, and also by gauges established at various points to indicate to pilots, captains, and others interested in navigation the stage of water on crossings and places of difficult navigation.

A self-registering tide gauge has been in operation at Astoria, Oreg., during the entire year.

Daily sheets from the Astoria gauge were exhibited on a bulletin board in that city. These show the state of water and condition as to roughness on the bar at the mouth of the river and are of great service to commerce.

It is estimated that $1,000 can be profitably expended in this work during the fiscal year ending June 30, 1895.

APPROPRIATIONS.

Act of—	
August 2, 1882	$500
July 5, 1884	1,000
August 5, 1886	1,000
August 11, 1888	2,500
Total	5,000

UPPER SNAKE RIVER, IDAHO, BETWEEN HUNTINGTON BRIDGE AND SEVEN DEVILS MINING DISTRICT.

This portion of the Snake River flows through a deep canyon and is swift, with many rapids and dangerous rocks. The bed and banks are hard basalt and granite. Navigation is almost impossible.

For the first 5 miles below Huntington Bridge the river is thickly studded with bowlders of all sizes up to 10 cubic yards, and also with points of the irregular bedrock projecting above the water, making steamboat navigation impossible at the lowest stages of water and dangerous at any stage. From there down to Sturgill Bar, distant about 21 miles, no rocks are encountered. At Sturgill Bar a grand bar has formed on the Oregon side which has contracted the waterway and forced the current over against the Idaho side among some rocks, making this one of the worst places on the river. From Sturgill Bar down, nothing exists to make navigation dangerous with a rise of water 3 or 4 feet above its lowest stage.

The river falls on an average 22 inches per mile. It begins to rise about the 1st of May and attains its maximum height about the middle or end of June; it then falls slowly until about the end of July, then falls more rapidly and reaches its low-water stage about the end of August; consequently the river can be safely navigated for four months each year if the obstructions on the river for the first 5 miles, and those at Sturgill Bar can be removed.

The country lying on both sides of this stretch of river is exceedingly rough and mountainous, and railroad building to reach important points will be very difficult and expensive. The region of country in the vicinity of the Seven Devils is unquestionably very rich in minerals, and the vast wealth there stored must be gotten out by some method of transportation cheaper than by wagons. At the present time indications point to the river as the best means to furnish this cheap transportation.

This part of the Snake River country is one of the best fruit-producing sections on the Pacific coast.

The Snake River Transportation Company have built a boat at a cost of $35,000, for the purpose of taking the copper ore from the Seven Devils Landing, which will be called Ballard Landing, to the railroad landing near Huntington. Of this ore 6,000 tons a year have been guarantied by one mine alone, and the company calculate to have 120,000 tons a year of it to carry. Besides the ore, the company expects to do a rapidly-growing river trade by bringing stores to the ranchers and taking away their produce, consisting of hay, grain, vegetables, and fruit.

Pine Valley, with a population of 600 and area of 20 square miles, is only 7 miles distant from, and with a down grade to, the river alongside of Pine Creek and at Brownlee Ferry. These people will be sure to use the boat instead of hauling their produce and stores, etc., as they now do, 50 miles to either Huntington or Baker City.

The plan of improvement, submitted in 1891, under provisions of river and harbor act of 1890, is to remove rocks and reefs from a channel 150 feet wide and put in ringbolts and iron posts to assist boats in lining up. The estimated cost is $80,000.

The first appropriation for this work, $20,000, was made by act of 1892.

The amount expended during the fiscal year ending June 30, 1893, was $17,917.71. A large amount of rock was removed from the channel just below Huntington Bridge.

The steamer has made but one attempt at running the river, and this was in the summer of 1892 before the work of improvement commenced. This trip apparently resulted in convincing her owners that the navigation of the river in its natural condition was impracticable, for she has been tied up ever since.

It is estimated that $60,000 will be required to complete the existing project, and that $25,000 can be profitably expended during the ensuing fiscal year.

COWLITZ RIVER, WASHINGTON.

This river empties into the Columbia at Montecello.

Prior to improvement the river was full of snags, drifts, and logs, and was navigable only 4 miles above its mouth. The navigable depth before improvement was 14 inches. This has been increased to 30 inches up to Toledo, 30 miles above the mouth.

The project for improvement contemplates a removal of the sand bars, snags, overhanging trees, rocks, and other obstructions in the channel from its mouth to a distance of about 50 miles above. The total amount appropriated for this work is $22,000.

During the past fiscal year a wing dam, 329 feet in length, was built at Keegans Bar, 3 miles below Toledo; also one at Toutle River Bar, 765 feet in length. These dams were both very effective, resulting in a deepening of the water about 15 inches at each place. This work was done by the crew of the Government snag boat. There were 163 snags and overhanging trees removed at the same time.

The removal of these obstructions from this river and the improvement of its navigation has been of great benefit to the farmers who have settled upon the fertile land through which it flows, in giving them cheap facilities for sending their products to the markets. It has encouraged settlers to locate here and clear the land, which was originally heavily timbered. A continuance of the improvement will add greatly to the prosperity of the valley.

It is estimated that $3,000 can be expended to great advantage in the ensuing fiscal year.

COMMERCIAL STATISTICS.

The commercial development resulting from the improvement has been large in comparison with the money expended.

	Tons.		Tons.
General merchandise	11,625	Passengers (42,237)	3,167
Hay and grain	5,020	Wool	10
Shingles (225,300 bundles)	2,816	Coal	100
Lumber (1,851,000 feet)	2,406		
Logs (113,000,000 feet)	282,500	Total	311,344
Live stock	3,700		

This shows an increase of 65,000 tons over the amount of freight for 1891.

PUGET SOUND AND TRIBUTARY WATERS.

As regards most of their characteristic features, these rivers may all be conveniently grouped under one general description. Heading in the Cascade Range, they flow in a westerly direction through gradually widening valleys to Puget Sound. Near their mouths is more or less open country, consisting of alluvial flats, or low, rolling hills. The extent of this description of land being notably larger in the case of the Nooksack and Skagit than of the others, these two rivers are therefore the most important of the five as regards their annual freight traffic. The aggregate navigable length of the five rivers is about 250 miles, and in their original condition they carried water enough for the purpose of steamer navigation, but were obstructed by snags, fallen trees, and log jams. They were the great highways of the country, traveling on land being almost impossible on account of the heavy timber, dense underbrush, and fallen logs.

The principal industries in this section are logging and farming. Various agricultural products are conveyed by river steamers to towns on Puget Sound. The rapid increase in population in the region drained by these rivers and the steadily-growing commerce present increasing demands for clearing them of obstructions.

The plan of improvement entered upon in 1880 contemplates the removal of snags, logs, trees, and other obstructions to navigation. For this purpose a snag boat, with an outfit of tools and appliances, has been provided. This boat passes from one river to another, doing service in each as far as the necessities of commerce require and the amount of the funds appropriated will admit.

The amount appropriated for this work to date is $84,000.

The amount expended prior to June 30, 1892, was $67,495.58. No permanent results were aimed at or obtained. The constantly recurring obstructions require to be periodically removed. The rivers were kept open and navigation rendered much safer.

The amount expended during the fiscal year ending June 30, 1893, was $7,998.28. A great number of obstructions were removed, and navigation was thereby greatly benefited.

An increase of the appropriation to $25,000 is recommended in order that the boat may be thoroughly repaired and the steam or hydraulic steering gear added.

No estimate for the final completion of the work can be made, as the improvement is not permanent.

COMMERCE.

Much of the commerce carried on by way of these Puget Sound rivers is desultory in character, and on this account and because the Government has no agents to gather statistics of commerce it is not practicable to give statistics of commerce which are complete and satisfactory; but the following statement is submitted by the engineer in charge of the snag boat *Skagit* as the result of his inquiries during the past year:

There are two regular steamers on the Snohomish River route from Seattle and three others running locally on its waters. The Skagit River route keeps two regular steamers employed from Seattle, and three others that run locally between river points only. The Nooksack River has two regular steamers running from Whatcom and other Bellingham Bay points.

Freight rates have been greatly reduced.

The following is a statement of the amount of business per month:

Route.	Freight.	Passengers.
	Tons.	*No.*
Skagit River, including the Stillaguamish	2,400	500
Nooksack River	360	120
Snohomish River	4,500	2,150
Snoqualmie River	366	100

The traffic in lumber, shingles, and other building materials does not enter into the above figures. The business is done principally by tugs with barges in tow, accounts of which I have been unable to obtain.

SWINOMISH SLOUGH, WASHINGTON.

There are in Puget Sound three routes for boats passing from the northern to the southern portion, or the reverse. One way is by taking advantage of the navigable waters of Padilla Bay, Swinomish Slough, and Skagit Bay. The other two routes are dangerous for smaller boats, owing to the heavy seas which prevail at times in the main sound to the west of Whidby Island, and to the dangerous passage through Deception Pass.

The routeby Swinomish Slough is the most easterly, and the safest for the smaller boats which ply on the sound and the many rivers and inlets thereof, as well as the shortest. It is, however, shallow and crooked in some portions, and the approaches to it are across the shallow flats of Padilla Bay on the north and Skagit Bay on the south.

As a general thing throughout the slough there is an abundant depth of water. Where it widens out, and especially where the Indians have been in the habit of putting fish traps, the depth decreases so that there is not over 2 feet at low water in any practical channel. What channel there is is very crooked.

Situated as it is, Swinomish Slough is a valuable highway for the local steamboats plying on the sound, for rafts of logs and lumber, and small sailing craft going up the slough and its branches, carrying merchandise and taking out the products of the country. It has been an important highway of commerce in the development of the Puget Sound country.

The plan of improvement, submitted in 1891 under provisions of the river and harbor act approved September 9, 1890, is to dredge a channel 100 feet wide and 4 feet deep, from deep water in Saratoga Passage,

across the Skagit Flats, through the shoals in Swinomish Slough, and across the flats in Padilla Bay to deep water; and to build wattled pile-dikes in Skagit and Padilla bays, to direct the tidal currents through the dredged channels. The estimated cost was $122,000.

The first appropriation for the work, $25,000, was made by act of July 13, 1892.

With the removal of the obstruction to navigation caused by the railroad bridge and the deepening of the channel as proposed, there can be no doubt of the greatly increased use of this short and safe route between the upper and lower portions of Puget Sound.

Aside from the through travel the improvement of Swinomish Slough will be of immense benefit to the commerce of the Skagit Delta through which it passes. This Skagit Delta is mostly composed of tidal marshes which have been reclaimed by diking and which have an almost fabulous fertility. They are penetrated by several tidal sloughs, opening into Swinomish Slough or into Skagit or Padilla bays, which are the principal highways for the removal of their products and the shipping in of merchandise, building material, etc.

No work had been done up to June 30, 1893, other than surveys and preliminary work.

Very great inconvenience is experienced by boats using the slough, due to shallow water.

It is very desirable that the slough be fully opened with the least delay practicable, and it is therefore recommended that the full amount to complete the project be appropriated, namely, $97,000.

COMMERCE.

The entire traffic of La Conner and surrounding country is carried on by steamers and scows, and while no returns are kept of their number, tonnage, or draft, it is safe to say that it requires a fleet of twenty small steamers with scows to handle the crops during the fall and winter months.

EXPORTS.

Articles.	Quantity.	Value.	Remarks.
Oats ..... tons..	30,000	$750,000	
Hay ..... do...	20,000	190,000	
Hops ..... do...	100	40,000	
Fruit ..... do...	100	30,000	
Lumber	.....	.....	Large quantity shipped; no record kept.
Butter and vegetables	.....	.....	Do.
Total	50,200	1,010,000	

IMPORTS.

General merchandise ..... tons..	5,500	$400,000	
Machinery ..... do...	.....	100,000	Quantity unknown.
Total ..... do...	5,500	500,000	

Western Washington is famous for its timber, and among the counties of the sound, Skagit stands preeminent in that respect, 75,000,000 feet being considered a very conservative estimate of the amount of logs placed in the water each year in that county alone. Those placed in

the Skagit River are debarred from the large mills on Bellingham Bay, and those in the Samish River and Padilla Bay are debarred from the markets at Seattle, Tacoma, and the large mill ports south of Skagit Bay, unless they are towed through Swinomish Slough, for it is not considered safe to attempt to tow them by way of Deception Pass, and it is rarely done.

Many booms are taken through the slough, but it is difficult work, owing to the sand bars and delays waiting for the tide. When dredged it is more than probable that rafts aggregating 100,000,000 feet annually will pass through.

WILLAPA RIVER AND HARBOR, WASHINGTON.

Willapa Harbor, formerly known as Shoalwater Bay, is an inlet of the Pacific Ocean 28 miles north of the mouth of the Columbia. The principal town on the harbor is South Bend, the terminus of a branch line of the Northern Pacific Railroad, situated near the mouth of the Willapa River. At the upper end of the town the river divides into a main channel and a secondary channel, known as Mailboat Slough; these reunite at the lower end of the town. Bars had formed in the main channel at both ends of the slough. There were also several bars in the Willapa River, between South Bend and Willapa City.

The plan of improvement, submitted in 1891 to comply with requirements of river and harbor act approved September 19, 1890, proposed to close the head of Mailboat Slough with pile, brush, and stone dikes, thereby throwing all the water into the main channel and scouring away the shoals; to dredge a channel 100 feet wide and 8 feet deep at low water through the shoal just below Willapa City; and to close Louderback Slough with a pile, brush, and stone dike, in order to compel the currents to scour a channel through the bar above the river mouth. The estimated cost was $31,350.

The first appropriation for this work, $18,000, was made by the act of July 13, 1892.

The expenditure during the fiscal year ending June 30, 1893, was $11,658.72. Of this amount $6,818.73 was expended on the Mailboat Slough dikes and $5,339.99 in dredging the shoal below Willapa City. About one-third of the dredging has been done.

The Mailboat Slough dikes were completed, and have already caused some deepening and marked widening of the channel over the bar at the lower end of the slough.

It is earnestly recommended that $13,350 (the amount necessary to complete the improvement) be appropriated for the fiscal year ending June 30, 1895.

COMMERCE.

The total amount of freight carried over the river during 1893 was 86,530 tons, valued at $1,205,800.

The number of vessels crossing in over the bar during the year was 113.

Three daily steamers run from South Bend to Willapa City.

The Tannin Extract Works, although established for nearly a year, have but lately exported any considerable quantity of their product, but the business of this industry is now constantly increasing.

The South Bend Lumber Mill is running on full time and greatly increasing its output. Another mill is to be built during the present summer. The shingle mills anticipate doubling their last year's product.

HARBOR AT STONINGTON, CONN.

Stonington Harbor is one of the important harbors of eastern Connecticut. It derives its importance to-day, first, as a harbor of refuge (being the harbor nearest to the ocean end of Long Island Sound), and next as a place of transshipment of passengers and freight from boat to rail on a through route from New York and the West to Boston and the East. As a harbor it has a good protection on three sides by the mainland and on the fourth side by a couple of breakwaters built by the General Government between 1872 and the present date; but its wharfage depth is limited to only about 12 feet at mean low water, although vessels of 18 feet draft can find shelter behind its breakwaters.

This harbor has been since 1828, and is now, under improvement by the General Government; during which time $338,000 have been spent in obtaining its present good harbor protection and its present 12 to 18 feet depth of harbor and anchorage. Some work still remains to be done upon its breakwaters to complete the already approved projects for the improvement of this harbor; but such work is already provided for by such past projects. During the interval from 1828 up to the present time the size of vessels and steamboats has steadily increased and the needs of increased facilities of navigation have increased in equal ratio.

The act of 1892 provided for an examination of this harbor with a view to further improvement. In the report thereon the engineer in charge says:

> To-day it appears desirable to straighten the entrance to the harbor by a cutting across Noyes Shoal, and to dredge a channel of at least 200 feet width and 17 feet depth up to opposite the city docks.
>
> The steady increase in the use of this harbor during past years, combined with the present large amount of commerce, and the fact that this commerce is mainly a through traffic between different States, all these are regarded by me as excellent and strong reasons for additional improvement by the General Government.
>
> I have therefore to state my opinion that, for the reasons above given, this harbor is worthy of further improvement by the General Government, and to submit my estimate of $1,200 as an amount that will enable me to make a survey and report, including a project, with estimate of the cost of the improvement proposed.

The present bill provides for this survey. The necessity, however, for a comparatively small amount of the requisite dredging is so urgent, in order to relieve the constant embarrassment of the deeper vessels, that it is deemed wise to provide for it without delaying for a report on the survey.

COMMERCE.

The present water commerce of the harbor is reported as about 70,000 passengers and 200,000 tons freight ($83,000,000) per year; almost all of this being a through travel over the combined steamboat and railroad line. This commerce is estimated at having developed nearly 80 per cent in the last thirteen years, or about 6 per cent per year.

COMMERCIAL STATISTICS.

The commerce arriving at and leaving Stonington Harbor by water during the calendar year ending December 31, 1892, is estimated as follows (based mainly upon reports received from Mr. Charles T. Stanton, collector of customs, Stonington, Conn.):

Class of goods.	Exports.	Imports.	Total.	Tonnage.
				Tons.
Fish, oysters, etc	$24,000	.....	$24,000	300
Grain and forage	.....	$33,000	33,000	1,800
Fertilizers	.....	2,000	2,000	100
Lumber and products	.....	150,000	150,000	7,500
Coal, mineral, and products	82,800	465,600	548,400	83,900
General merchandise (about)	40,000,000	43,000,000	83,000 000	200,000
Sundries	.....	137,000	137,000	4,300
Total (about)	40,000,000	44,000,000	84,000,000	300,000

LUBEC CHANNEL, MAINE.

This channel lies between the eastern extremity of the State of Maine and Campobello Island, Dominion of Canada.

Originally the channel was but 5 feet in depth at mean low water, and but 2 feet at low water of spring tides.

The project adopted in 1879, and subsequently modified, was for a channel 275 feet wide, 300 feet wide in the bends, and 12 feet deep at mean low water.

The expenditures to June 30, 1892, amounted to $168,954.42, and the above project had been practically completed.

Under the provisions of the river and harbor act of September 19, 1890, an examination of Lubec Channel was made, and the report was published in the Annual Report of the Chief of Engineers for 1891 (page 616).

In this report the engineer in charge says:

> Sail vessels having the right of way, meeting in the channel is very embarrassing to steamers moving with the current, which must go ahead or lose steerage way, and if stopped are likely to be driven upon the bank. An experience of the kind mentioned has been sufficient to keep large steamers from using the channel, save at high stages or on a rising tide.
>
> Before improvements were made vessels rarely went through, save at or near high water. Many sailing vessels now go through at all stages, except at extreme low water, at which time the channel depth is but 8 feet.
>
> In going to the harbor of Eastport or to Passamaquoddy Bay and the St. Croix River from the east the distance saved by going through the narrows is about 10 miles. The inner route is sheltered from the open sea, and is the only one not in waters belonging to the province of New Brunswick.
>
> The records of vessels passing in sight of the light station at Quoddy Head and life-saving station near the same point indicate 20,000 annually. With very many of these Lubec Channel is not only an element of convenience, but of safety.
>
> The work is not at all local in its character, and local statistics, therefore, give but little indication of probable benefits.
>
> The question of expense is of prime importance in considering the worthiness of the improvement. I have, therefore, indicated upon the tracing the lines to which the present dredged channel should be widened in order to afford a fair amount of room for safety and convenience.
>
> The channel thus outlined is 500 feet wide at its narrowest place near the light-house, and is widened somewhat toward the anchorage. The upper part of channel proposed has a width of 650 feet, in order to make room in the bend and to give a better direction.

The expense of dredging to a depth of 12 feet at mean low water, or 8 feet at extreme low water throughout the channel thus outlined, may be estimated as follows, viz:

600,000 cubic yards measured in scows, at 35 cents	$210,000
Contingent expenses of engineering, 10 per cent	21,000
Total	231,000

It is my opinion that the channel is worthy of improvement.

The maps now in this office being considered sufficient for the purpose of plans and estimates, no estimate of the cost of a survey is here submitted.

HARRASEEKET RIVER, MAINE.

This is a tidal stream emptying into Casco Bay about 3 miles from Freeport, which is at the head of tide water.

As far as Freeport Landing the river is in reality a tidal branch of Casco Bay. From Casco Bay proper to Weston Point, a distance of about 2 miles, the river has a least depth of 10 feet at mean low water. At mean high water the lower part of the river, therefore, has a least depth of 19.4 feet, which is ample for any present or probable requirements.

From Weston Point to Freeport Landing, a distance of about 4,500 feet, the channel is bordered with wide flats, which are uncovered at low water.

The project adopted in 1890 is to obtain a channel 60 feet wide and 14 feet deep at mean high water by dredging.

The estimated cost of the improvement was $36,000. Congress appropriated $10,000 for the work by act of September 19, 1890.

There had been no expenditures up to the close of the fiscal year ending June 30, 1892, and no work had been done, as it was not deemed expedient to expend any money on the improvement until sufficient funds had been appropriated to accomplish more work than could be done with the amount at that time available.

The act of 1892 appropriated $16,000 for this work, which, with the $10,000 on hand, was believed to be sufficient to complete it.

Proposals for dredging were twice invited by public advertisements, but the prices were regarded as high, and all the bids were rejected.

It is now evident that a small additional appropriation will be required to complete the improvement without interruption, and this is very desirable as a matter of economy.

COMMERCE.

The probable commerce is dependent upon the improvement of the channel. During the past season 4,000 tons of coal have been laid in for use at Freeport at a cost of at least 75 cents per ton more than the same would have cost had freights been practicable by water.

A stone quarry near the Freeport Landing contains a very superior quality of granite for building, paving, or monumental use. This granite has no superior for any of the purposes named, and the quarry is already in a fine condition to supply a large demand. This stone is now shipped to many points in the West, but it can not be taken to any of our seaport cities because it has no outlet by water and can not compete with other places which are more favored.

A fine quality of bricks is now made at Freeport, amounting to 700,000 annually. The quantity is now limited to local demands, owing

to impossibility of shipping them at rates which enable the manufacturer to deliver them at distant points. There seems to be reason to believe that this industry would be largely increased by improving the channel so that vessels of good size can reach the landing at Freeport.

In the past few years Freeport has developed into an active business place; a large shoe factory and steam mills for grain and lumber have been put in active operation, in addition to the stone and bricks already mentioned. The population of this town is 2,500.

A steamboat makes two trips daily between South Freeport and Portland. The contemplated improvement will allow her to come up within a mile of the center of the village.

PAWCATUCK RIVER, RHODE ISLAND AND CONNECTICUT.

The navigable part of the Pawcatuck River extends from the town of Westerly to Little Narraganset Bay, and the object of the improvement is to deepen and widen this channel.

Before improvement, the channel was crooked and obstructed by numerous shoals, on some of which there was but $1\frac{1}{4}$ feet of water at mean low water.

Between 1871 and 1876 $50,000 was appropriated for the excavation of a channel $5\frac{1}{2}$ feet deep at mean low water, and 75 feet wide below the wharves, and from 35 to 40 feet wide between the upper and lower wharves, this work being completed in 1876.

The approved project of 1885, as modified in 1892, provides for the deepening and widening of the river so as to secure a channel of at least 8 feet depth at low water, with 100 feet width from its mouth up to the lower wharves of Westerly, and thence a channel of the same depth with about 40 feet width up to the upper wharves of the city; all at a total cost estimated in 1891 at $42,400, of which $38,600 was appropriated prior to the commencement of the fiscal year.

At the adoption of the present project the channel was limited to 5.5 feet depth, over 75 feet width below the city, and the same depth over 35 feet width opposite the city; and rock ledges covered the channel at several points.

Forty-one thousand eight hundred dollars has been appropriated and $37,846.06 had been expended on this work up to June 30, 1892, by which the 8-foot channel had been completed from deep water upward for full width to within a half mile of the city, and for partial width for the remaining distance; and the rock ledge obstructions had been removed from the channel below the city.

During the past fiscal year plans have been made for work under the new appropriations, all work to be done by hired labor and the use of the Government plant. No work, except of preparation, has as yet been done in the field.

The balance available, together with $6,000 appropriated by the accompanying bill, will be applied to excavating the channel to a width of 40 feet between the lower and upper wharves in the town of Westerly, and continuing the excavation of the channel to the full width of 100 feet.

COMMERCIAL STATISTICS.

The commerce arriving at and leaving Pawcatuck River by water during the calendar year ending December 31, 1892, is estimated as follows (based mainly upon reports received from Messrs. Maxson & Co., Westerly, R. I.):

Class of goods.	Exports.	Imports.	Total.	Tonnage.
				Tons.
Grain and forage	.....	$11,000	$11,000	600
Lumber and products	$1,500	100,000	101,500	5,100
Coal, minerals, and products	26,000	162,000	188,000	33,700
Sundries	16,000	.....	16,000	1,900
Total	43,500	273,000	316,500	41,300

The passage of vessels through this waterway is estimated as follows (each entrance and departure together being counted as one passage):

Character or class of service.	No.	Average draft.	Average tonnage.
		Feet.	*Tons.*
Steam:			
Freight and passenger	600	8	300
Passenger, mainly	250	6	80
Tugs	600	6	75
Pleasure boats	150	3	10
Sail:			
Freight	150	8	300
Pleasure boats, large	100	3	10

Pawcatuck River is in the collection districts of Providence and Stonington, the dividing line passing through the river. Providence and Stonington are the nearest ports of entry. The revenue collected in the last calendar year was: Providence, $385,887.01; Stonington, $1,932.26. The nearest light-houses are the Stonington and Watch Hill lights. The nearest fortification is Fort Trumbull, New London, Conn.

NEUSE RIVER, NORTH CAROLINA.

The Neuse River, entering into the Pamlico Sound, has a total length of about 360 miles and a drainage area of 5,781 square miles (2,506 of which are situated above the mouth of its upper main tributary, the Contentnia).

When placed under improvement in 1878 this river had during nine months of the year a 9-foot depth of channel from its mouth 40 miles up to Newbern, thence a 4-foot depth 50 miles farther to Kinston, thence a 3-foot depth 45 miles farther to Goldsboro, and thence a 2-foot depth 55 miles farther to Smithfield, this channel depth being reduced during the low-water season to 8 feet at Newbern, 2 feet at Kinston, and 1 foot at Smithfield. Over the whole 190 miles the river was so blocked by war and other obstructions that navigation was impracticable.

The project of 1871, as modified or extended in 1878, 1879, 1880, and 1883, is to remove the war obstructions, to clear the channel to Smithfield of all snags, logs, and overhanging trees, to contract the channel way by jetties so as to insure during the entire year an unobstructed 8-foot navigation to Newbern, a similar 4-foot navigation to Kinston, and during nine months annually a 3-foot navigation to Smithfield, at a total final estimated cost of $374,000.

Under this project $282,500 have been appropriated and $262,535.42 expended to June 30, 1893.

At that date there was a good navigable channel, 8 feet deep, to Newbern, but between Newbern and Kinston there were 9 shoals, over which not more than 2 feet could be carried at low water. The snags and trees had been removed up to Kinston. The amount (estimated) required to complete the existing project, $91,500.

COMMERCE.

The commerce for the year ending December 31, 1892, is estimated as follows:

Class of goods.	Tons.	Class of goods.	Tons.
Cotton	3,385	Turpentine, crude and spirits of, and rosin	3,140
Cotton seed, meal, and oil	180	Lumber and its products	177,400
Tobacco	17	Fertilizers	9,450
Rice	245	Machinery	310
Grains	6,500	General merchandise	29,462
Vegetables, including truck	17,500	Coal and minerals	2,900
Live stock, including poultry	170		
Meats and their products	1,125	Total	253,704
Fish and shell fish	1,680		
Tar	240		

Freight rates are from 25 to 60 per cent less than in 1878, when the improvement was undertaken.

BOAT RAILWAY, COLUMBIA RIVER, OREGON AND WASHINGTON.

A provision of the river and harbor act of 1892 authorized the President—

to appoint a board of engineers, to consist of seven members, of whom three shall be from civil life, whose duty it shall be to thoroughly examine the obstructions to navigation in the Columbia River, in that portion from the navigable waters thereof below Three Mile Rapids to the navigable waters above Celilo Falls, and report as soon as they conveniently can to the Secretary of War such plan for overcoming or removing said obstructions as in their opinion is most feasible and best adapted to the necessities of commerce, together with a statement as to the usefulness of such improvement to navigation, its relation and value to commerce, and the most desirable location therefor, the cost of construction and of the right of way, including the necessary land therefor, being considered. They shall also report the details of such plan, with estimates of its cost.

The board thus created have convened, examined the above-mentioned obstructions, and, after careful deliberation, reported substantially as follows:

The Upper Columbia is navigable 198 miles to the foot of Priests Rapids, except, in extreme low water, 10 miles at the mouth of the Snake.

At low water the Lower Snake is unnavigable for 53 miles, the improvement of which and of the rapids below would open about 200 miles additional of the Snake and the Clearwater to continuous navigation.

There is now no commerce to tide water on either stream by reason of the insuperable barriers at Celilo and The Dalles.

The removal or overcoming of these obstructions will open for these rivers an outlet to the sea.

The fertile country within reach of these streams sends most of its product to the Pacific coast.

Free navigation means free competition and a reduction of transportation rates.

The methods of overcoming these obstructions in a commercial sense are these:

First, by a portage railway extending from Celilo to a point below the Three Mile Rapids.

This railroad will be comparatively inexpensive and can be quickly built, giving the immediate relief demanded by the wheat-growers of the interior. It does not overcome obstructions in the sense of passing the vessel, but involves transshipment at each end. Its capacity, as determined by experience, is, with hand labor and one incline at each end, 1,600 tons per day, which can be doubled by the

duplication of the inclines. It may also be considerably increased at small cost by the use of machinery.

Second, by a boat railway, by which the steamboat or barge would be lifted by hydraulic power from the water on a car with wheels, which, upon arriving at the proper elevation, would be run upon a railway track, hauled by locomotives to the other terminus, and lowered by hydraulic lifts to the water below. The maximum lift at Celilo is 47 feet and at Big Eddy 77 feet.

The board regards the boat railway as feasible with curvature not exceeding one degree (or a minimum radius of 5,730 feet) and with the modified form of car proposed. It is, however, as yet experimental and has certain disadvantages as compared with a canal.

There is no fuel supply in the wheat districts. Boats on the Snake are now supplied with wood cut 100 miles to the westward and transported to the river by rail. This circumstance, together with the distance of the wheat lands from the river and the number of rapids in the Columbia, is not favorable to a cheap transportation on the upper river. But whatever may be the extent of the navigation in the future, it may be said that when the great obstructions at the Cascades and the Dalles shall have been overcome, the fact of an unobstructed waterway to the sea will act as a corrective of excessive rates of transportation by rail.

In view of these facts, the board is of opinion that a portage railway will meet the urgent demands of the wheat district, will supply the present necessities of commerce, and be useful in the construction hereafter of a canal. Believing that the boat railway, although feasible, is as yet experimental and has certain disadvantages as compared with a canal; believing also that a canal can be built within reasonable limits as to cost, the board respectfully reports:

First. That the obstructions to navigation in the Columbia River from the navigable waters thereof below Three-Mile Rapids to the navigable waters above Celilo Falls can be overcome in the most feasible, speedy, and economical manner, and in that best adapted to the present necessities of commerce and to its future development, by the construction of a portage railway, of standard gauge, on the south side of the Columbia River, from Celilo to Dalles City, the cost of which is estimated to be $454,390.

Second. When the necessity shall arise for accommodation greater than can be furnished by a portage railway, this board recommends that the construction of a canal, located on the Oregon side of the river, be undertaken.

The usefulness of this work to navigation arises from the fact that it opens a free communication from the upper rivers to tide water, a merit common to all methods of overcoming the obstructions about the Dalles.

Its value to commerce consists in permitting a line of transportation by water, upon which competition shall be absolutely free.

The effect of this competition may or may not be to divert large quantities of traffic from the railways to the water lines, but all experience shows that the possible competition will be a great regulator of railway rates, not only at competing points, but by their reaction upon the general transportation rates of the surrounding country.

The question of the right of way was investigated by a special committee of the board. The surveys having shown that the south bank of the river is in all respects to be preferred to the north bank for the location of a portage railway, a boat railway, or a canal, it became unnecessary to consider the cost of interfering with the location and rights of the Columbia Railway and Navigation Company, which occupies the available ground on the north bank. On the south or Oregon side private owners of property have promised to give the right of way for either improvement, upon being paid for actual damage to buildings, orchards, etc.

The more important interference is with the Union Pacific Railway, successor to the Oregon Railway and Navigation Company. The right of way of this company is generally 100 feet in width on each side of its center line, and either improvement must encroach upon it for considerable distances. In addition to the encroachment, either of these projects would also require the track of the railway to be shifted to the south in several places to a greater or less extent, to make room for the proposed construction. These changes would improve, rather than injure, the line and grades of the Union Pacific, and their cost, which would not be great, is included in the estimates of the several projects. Aside from these changes, the cost of right of way for either project is estimated at $30,000 as given above.

The Union Pacific Railway Company, being asked if it would permit the proposed construction to be made upon being paid in full for all necessary alterations of its line or works, declines to make a specific reply until more definite information shall have been furnished. It suggests, however, that if the construction of a railway of ordinary type (a portage railway) is contemplated, its own line should be used in connection with the navigation of the river above and below the points referred to. Celilo and Dalles City.

In the opinion of the Board this suggestion is totally inadmissible.

The suggestion of a dam at the head of The Dalles to pond the water back to the foot of Celilo Falls has been presented to the Board, and has been favorably considered, but the data are not available and can not be obtained at this time to justify its recommendation. The project requires a short canal, with locks at Celilo, and another from the head of The Dalles to Big Eddy, and is not free from objection on the score of interference with water rights and fishing interests. The Board, however, suggests that the necessary surveys be made, so that when an enlarged improvement shall become necessary this plan may receive consideration as an alternative proposition.

The railway and car, as projected, will pass the flat-bottomed boats usually employed on these rivers, when in good condition, weighing, with cargo, up to 600 tons, and not exceeding 168 feet in length by 38 feet in breadth.

The maximum capacity of the system with the estimated equipment, 2 cars and 4 locomotives, is 16 boats each way per twenty-four hours; with a full equipment, at an additional cost of half to three quarters of a million, the maximum capacity has been estimated at 40 boats each way per day.

Third, by a canal. From previous estimates upon partial canals at these points, and from other information, the board has derived the impression that a continuous canal was inadmissible by reason of its great cost. Under this impression the funds at its disposal were appropriated to surveys and plans for a portage railway and a boat railway, and none remained for the survey of a canal. That nothing should be neglected, however, an estimate was made from such former surveys and other data as were available, supplemented by personal observations upon the ground, the result of which was so favorable as to modify materially the opinions of the board.

This estimate was necessarily not exact, but the majority of the board are of opinion that a canal of capacity to pass boats of the dimensions for which the boat railway provides will not greatly exceed $4,000,000. This sum is considerably in excess of the cost of a boat railway, but the cost of operation of a canal will be less, its capacity greater, and its limitations less upon the character and condition of the boats. The width of the proposed canal is 100 feet at bottom and its depth 6 feet. Its length is sensibly the same as that of the boat railway, about 8⅓ miles, the location, like it, on the Oregon side of the river, and the termini the same or nearly so at Celilo and Big Eddy. The lift of the lock at Celilo is at low water 20 feet, raising the boat above all ordinary river floods. At Big Eddy the height above low water is 72 feet, which can most speedily be overcome by a hydraulic lift or elevator carrying a caisson in which the boat remains afloat. Intermediate are two locks with lifts of 15 feet. With greater expenditure of water, time, and attendance, a flight of locks may take the place of the lift at the Big Eddy.

The water supply will be by a feeder 13,000 feet in length from the river Des Chutes.

The drifting sands which occur at the same points on all these lines will be a source of expense in maintenance of either system, as they now are to the Union Pacific Railway, adding a certain sum to the cost of its operation. The high wind generally prevailing in this gorge will also obstruct the movement, affecting particularly the boats on a canal.

Location.—While a portage railway may be aligned with advantage upon the Washington or northern bank of the Columbia, the boat railway, owing to necessary restrictions as to curvature, and also to the fact that its construction would materially interfere with the projects of the Columbia Railway and Navigation Company now said to be on the point of development, would, if placed on the north bank, involve largely increased expenditure and a doubtful issue. For these reasons it has appeared to the board expedient to confine its location to the Oregon bank.

Estimate.—The portage railways considered are two in number. They both extend from Celilo to Dalles City and are both about 12¼ miles in length. They have not the same alignment. One is to be built upon the lines and grades of the boat railway from Celilo to Big Eddy, so as to form with its roadway a portion of the wider roadbed of the larger work. The cost of this line is $682,301. It requires that the line of the Union Pacific Railroad should be shifted at several places, the cost of which, together with a right of way, is included in the estimate. The sum of $429,705 expended on this line would be directly applicable to the boat railway if subsequently built. The ultimate cost of the portage road and the boat railway when built would be $2,517,063.

The cost of the boat railway alone would be $2,264,467, which includes the sum of $170,000 for the improvement of the channel at Three Mile Rapids.

The other alignment of the portage railway was made without regard to a boat railway and with a view to the least expenditure for construction. It would cost $454,390, of which $156,285 would be applicable to a boat railway from Celilo to Big Eddy.

In all these estimates the sum of $30,000 is included for right of way.

As already stated, the cost of the canal will not, it is believed, exceed $4,000,000.

In considering these projects with a view to selecting the one "best adapted to the necessities of commerce," the board is embarrassed by the difficulty of forecasting future commerce on the river.

At present there is no commerce on the Columbia above Celilo. It can not be doubted that when the obstructions to navigation near the Dalles shall be removed there will be a commerce, although the extent of its development can not be foreseen.

Col. G. H. Mendell, president of the board—

recommends a boat railway from Celilo to Big Eddy on the Oregon side of the river. In other respects he concurs in this report, with the qualification that the portage railway therein recommended be aligned and constructed in such manner that it may be, for most of its length, a component part of a boat railway to be subsequently constructed.

The cost of the portage railway from Celilo to Dalles City, as thus built, will be $682,301, of which amount $429,705 will be directly applicable to the boat railway, which will require, in addition, for its completion $1,834,762. The cost of improvement of Three Mile Rapids, estimated to be $170,000, is included in this sum.

Lieut. Edward Burr, Corps of Engineers, secretary of the board, to whom was assigned the duty of preparing a design for a boat carriage, gives in appendix 1 a description of the boat railway and appliances as they are recommended.

This method of transferring boats, while nowhere used as here proposed, is feasible, and as projected its capacity is sufficient for anticipated needs of commerce. In cost of construction it comes much less than a canal, and it is well adapted to local conditions existing at the Dalles.

There is a great advantage in constructing the boat railway at this point by parts—with an interval of several years. The track first built, used as a portage road, will serve to develop commerce, now nonexistent, on the upper river. It will thus determine the classes of boats and barges best adapted for profitable service under the peculiar circumstances of navigation there existing. From these data the dimensions of cars, lifts, and locks required to transport boats become fixed, and the transportation system, when completed, is then proportioned to needed requirements.

For want of better information the boat-railway project has been proportioned for the largest boats used some years ago, when navigation on the upper river existed. But it would unquestionably be the part of prudence to defer construction of lifts and cars until new conditions of production and commerce shall have determined future dimensions of boats, which will probably be larger than they were a few years ago.

The considerations also apply to the locks and lifts of a canal, if this mode of transfer be preferred.

Mr. E. P. Alexander, a member of the board, after dissenting from the majority of the board as to certain facts relative to the canal project, adds as to the boat-railway project:

This report is accompanied with a complete and carefully studied project for a boat railway, with all appurtenances and equipment, and careful estimates of cost based upon actual survey and location on the ground. (*See* Appendix No. 1.) The board unanimously regard it as entirely feasible, and say of it: "The railway and car as projected will pass the flat-bottomed boats usually employed on these rivers, when in good condition, weighing with cargo up to 600 tons, and not exceeding 168 feet in length by 38 feet in breadth."

The Board also unanimously estimate the entire cost of the same as $2,264,467, which includes cost of right of way and damages, and also a desirable improvement of the Three Mile Rapids. Its capacity, at that cost, would be 16 boats each way per day, but capable of expansion at moderate cost to 40 boats each way per day, as set forth in the above report.

The undersigned, believing such results to be at once a satisfactory solution, and the only economical solution of a problem of peculiar and increasing difficulties, now recommends that this project be adopted as the project for final execution.

Meanwhile, also, as its complete construction will require several years, under the ordinary conditions attending such work by the Government, and as even such a partial "overcoming of the obstructions" as can be afforded by a portage railroad will produce beneficial results to commerce more than commensurate with the expense involved, and sufficient for present necessities, the undersigned further recommends that, while the right of way for the full project shall be at once secured and held in possession, only one of the two tracks necessary to the full project shall be constructed at present, and that instead of erecting the hydraulic lifts at Celilo

and Big Eddy a portage extension of this track shall be made from Big Eddy to Dalles City, and proper inclines and equipment provided, in order that the line may be utilized speedily as a portage road, and worked as such until the increasing demands of commerce require the completion of the full project. Of course, also, when that time arrives all of the details of this project would have the benefit of whatever advances and improvements the experience of all kindred enterprises elsewhere in the world may meanwhile suggest. The estimated cost of this present construction and equipment here recommended, with right of way for the full project, is shown in the attached exhibits, based on actual location, as $682,301. Of this sum $429,705 would operate to reduce the final cost of the full project, so that its future completion would cost but $1,834,762, a grand total of $2,517,063.

The portage road proper, recommended by the majority of the board, is estimated to cost $454,390. It provides only present and partial relief, leaving the future to care for itself, and holding out but a vague and uninspiring hope that further surveys may show that "not much more than four millions" may give full relief, if the right of way remains indefinitely as cheap as it is at present.

The recommendation of the undersigned, at an additional present cost of but $227,511, provides exactly the same present relief, takes ample care of the future at a further cost of much less than two millions, and takes no risk of future cost and difficulties in procuring the right of way.

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Senate documents

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